FLIGHT, MAY 16, 1935

FIRST AERO WEEKLY IN THE WORLD

REGD. AT THE G.P.O. AS A NEWSPAPER

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

No. 1377
Vol. XXVII

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

SIXPENCE
EVERY THURSDAY

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

Founded in 1909

FIRST AERONAUTICAL WEEKLY IN THE WORLD

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Controllable Pitch or—?

IN view of the increasing use being made at home and abroad of controllable-pitch airscrews, the time would appear opportune for reviewing the situation and for examining the gains that may be expected and the price which is likely to have to be paid for these gains. As with everything else in engineering, and particularly in aeronautical engineering, there is no clear-cut case one way or the other, and compromise is, as usual, the solution.

In the last two issues *Flight* outlined some of the reasons for using controllable-pitch airscrews, describing and illustrating a number of typical solutions of the mechanical problems involved. Mention was also made of what may be found to be a useful alternative, though it has not so far made very much headway—the two-speed reduction gear.

Opinions are by no means unanimous that the controllable-pitch airscrew or the two-speed reduction gear are the only or even the best solutions, and there is a school of thought which holds that neither is really worth its weight, cost and complication. Those who hold this view offer as a cheaper and easier way out of the problem the use of engines capable of giving a large percentage of increased power for purposes of take-off. The introduction of 87-octane fuels has indicated that not only is a much better fuel consumption possible, but modern engines designed for this fuel will stand without damage a much increased output at ground level. If, as seems quite probable, fuels of even higher octane value come into use, it is held that engines will be able to give so much extra power for the take-off that the controllable-pitch airscrew will not be necessary. The possibility of using the high-octane fuel for the take-off and climb only, switching over to a fuel of lower octane value when the operational height has been reached, offers certain attractions for commercial work. It would be interesting to have the views of readers on the subject.

Seeking the Ideal

THE search for the ideal small aeroplane for the private owner dates from the 1923 competition at Lympne. Indirectly, this competition produced the "Moth," and it is interesting to recall that some early films showed Capt. Broad towing a "Moth" (KT were its significant registration letters) with folded wings behind a two-seater Morris-Cowley car. Now, eleven years later, we read that Americans are trying to develop a road-air Autogiro which shall travel with folded rotors along a road under its own power. From the motor car point of view, probably its consumption figure is not too economical, but this instance of the whirligig of time is interesting.

Surface transport under its own power is nothing new for the seaplane class of machine, and not a few instances are on record of flying boats which during the war picked up the crew of a damaged consort and taxied away with them, being unable to take off with the double load. It is also recorded that members of the crew, in such circumstances, were sometimes sea-sick. Such transport is certainly not the ideal.

Probably there has been no greater authority on the needs of the private air tourer than the late Bert Hinkler, and we wonder that no one has ever done anything with the little "Ibis" amphibian in which he embodied the fruits of his unrivalled experience.

Parachutes in War

SOME discussion has recently arisen as to whether men descending by parachute from an aircraft disabled in air combat should be immune from further attack. The Great War provides very little precedent on this subject, because parachutes were seldom, if ever, carried in aeroplanes, certainly not in British aeroplanes. The lack of them provided some of the most awful tragedies of the air war, when unharmed men found themselves

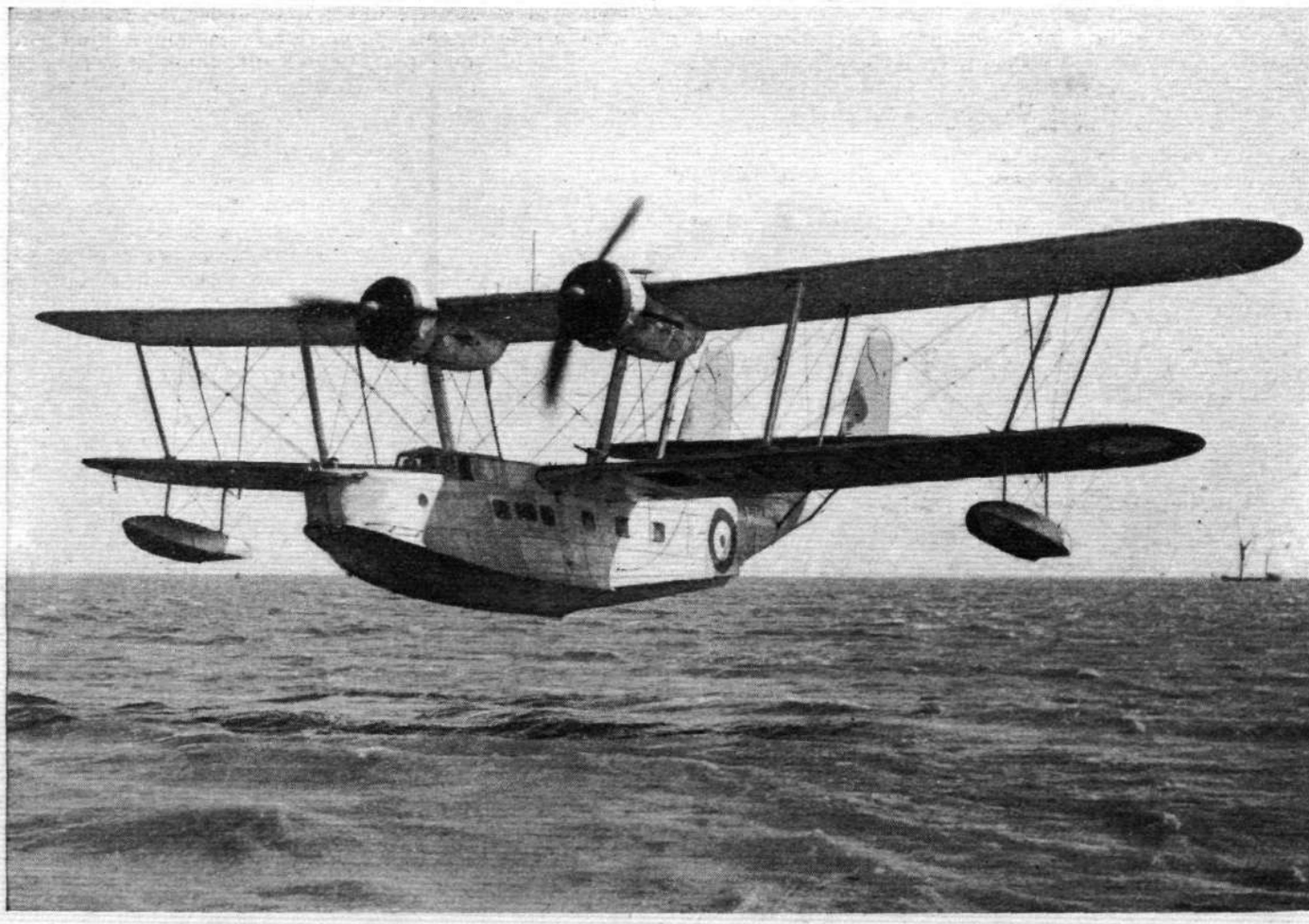
in a burning aeroplane, and had to choose between death by fire and death by jumping out. The famous American pilot, Raoul Lufbery, always declared that if his machine were ever set on fire he would jump though he had no parachute, and he carried out his resolve. Major Mannock, V.C., declared that in similar circumstances he would shoot himself with a revolver, but whether he did so is not known. There were also numerous cases of a pilot of a two-seater being killed or wounded, and the observer being carried down helplessly to crash. Parachutes were used in kite balloons, and to drop agents behind the enemy's lines. If there is ever another war their use will be universal, and therefore it is not without interest to study the question of attack on a man who has jumped with his parachute.

The Hague Rules

Rules of air warfare were drawn up by jurists at The Hague in 1923, and Article 20 reads as follows: "When an aircraft has been disabled, the occupants, when endeavouring to escape by parachute, must not be attacked in the course of their descent." The observer in a balloon usually jumps before his aircraft has been set on fire, and, therefore, would seem to gain no immunity from this Article. In the case of aeroplanes, the crew rarely jump before the machine has been disabled, and it is more interesting to consider their case. Some people are too prone to say that no rules of war have now any value, but such statements are thoughtless. There must be rules of war, and the important thing is to see that they are sensibly framed and do not attempt to forbid too much. It is rules which attempt to hamper belligerents and fighting men beyond reason which are sure to be disregarded in practice.

This Hague rule attempts to forbid too much, and for that reason is not likely to harden into a practice in warfare. Fighting nowadays is carried out, not, as in the days of Froissart, for the honour and glory of individual knights, but in order to defeat the enemy. It is usually more important to put the crew of an aeroplane out of action than to destroy the aircraft itself. In war material is cheap, but trained pilots and air gunners are valuable. Putting the crew out of action does not necessarily mean killing them. It is sufficient to make them prisoners, and in all civilised warfare prisoners of war have definite rights. To allow enemy airmen to escape, to live to fight another day, would be a dereliction of duty on the part of the victor in the fight, however much it might conflict with his chivalrous instincts to attack the helpless parachutists.

The whole question, therefore, hinges on whether the parachutists are dropping on their own ground—where they are likely to escape to their friends—or are almost certain to be taken prisoners when they reach the earth. In the latter case the victorious airman would have no right to attack them during their descent. If there were no well-defined trench lines, the victor might well be in doubt as to his duty, and whatever he did would probably be able to excuse his action. He must not forget that his duty is to his country, and his private inclinations must not be allowed to outweigh that duty.



MAKING FRIENDS AT FELIXSTOWE: The new Supermarine "Mark V" flying boat (two "Pegasus III"), on test at Felixstowe last week. Her remarkable take-off is due in no small measure to the 775 h.p. available for that purpose from each of her engines. (*Flight* photograph.)

The Outlook

A Running Commentary on Air Topics

Air Route Planning

ALTHOUGH the Aerodrome Owners' Association has received a reply from the Air Ministry concerning the suggestion that a national air route plan should be evolved, the position, for the time being at any rate, appears to be precisely as before. The Air Ministry, it is true, has taken over the survey which was originally assigned to the Aerodromes Advisory Board, but in the meantime the municipalities are advised to make up their own minds and to safeguard or to purchase prospective sites.

Of course, the question of where and how air lines are operated remains one for the operators or prospective operators themselves; the Air Ministry can only advise and make rules to ensure their safety. Time after time one meets members of airport committees and the like who tearfully complain that "Little Pothunting has an air line, so why have we been left out?" and who propose to write a strong letter to the Air Ministry or to their own particular members of Parliament—just as if the Government is likely to run its own air lines for their benefit.

Guiding the Private Owner

WITH the existing wavebands already so overcrowded, it appears to be fairly obvious that the private owner of the future will be actively discouraged from making use of any normal transmitting set. Already his requests take a very second place to those made by airline pilots while flying in thick weather.

What, therefore, of the possibilities of producing for him a suitable version of the radio compass? With the aid of an instrument which will give him the direction of any transmitting station within range and within his wavelength limits he can at least have very little excuse for being lost. Under such conditions, of course, his movements will in any case be severely restricted, but it is unreasonable to suppose that he will be denied the use of any part of the sky.

As it happens, such an instrument, weighing only about 30 lb., is at present being tested in America by Miss Earhart for the Bureau of Air Commerce. There, of course, a radio compass is likely to be a great deal more valuable than in this country.

Bombing Psychology

THOUGHTS of air bombardment have recently been setting the nerves of all Europe on edge, and Britain is soon to follow the example of other nations in making preparations to safeguard the civil population, even though the probable danger is only from H.E. bombs which have missed military objectives. Consequently, the popular picture of the captain of the bomber aircraft is of a stern executioner who sits serenely aloft dropping his death-dealing missiles without fear or compunction. A truer picture would be that of a man who has forced his nervous system to overcome the terrors aroused by manifold dangers. "Archies" have claimed few victims, but the effect on the nerves of a shell bursting near one's aeroplane is certainly disconcerting. The records of the Zeppelins show that commanders were sometimes only too glad to unload their bombs on any glimmer of light and then make for home.

The psychology of the bomber pilot is also likely to be affected when the presence of bombs on his machine makes a great difference to its speed. In the case of the Northrop bomber, for example, where, owing to the adoption of multi-spars and a stressed skin, it is not possible to carry the bombs inside the streamline shape of the machine, the bomb racks alone knock some seven or eight miles an hour off the top speed, while the bombs themselves cause the loss of a good thirty miles an hour. If the crew of such a machine were to have a bad time from the defence, he would be a stout-hearted pilot who would not long for those extra thirty m.p.h. which would be his as soon as he had unloaded his bombs. To some men the temptation to decide that the ground (possibly open fields) below them was their allotted target would prove irresistible.

Rudderless in America

IT appears that the U.S. Bureau of Air Commerce is going all out to discover or to design a machine which really can be used with perfect safety and ease by the ordinary man or woman.

Recently the Bureau has ordered three machines, details of which are given on page 541, one an Autogiro, one a conventional type fitted with a modified car engine, and one an entirely unconventional type in which the idea of control simplification is to be thoroughly tested.

Not only is this machine to be fitted with a "foolproof" undercarriage, but it is to have no rudder and no elevators in the accepted sense of the terms. Special ailerons will control turns, and special flaps, interconnected with the throttle, will control the approach angle. In other words, two major controls will deal with the horizontal angle and the direction of flight.

To the person brought up on the conventional type this conception may appear to be over-ambitious, but to the lay mind it is only logical—and the lay mind is likely to count for more and more in the not-too-distant future. Certainly experiments on any new lines are worth following up, and we in this country hope that one or two recent developments will modify the general attitude towards private ownership.

Fluttering in the Breeze

TROUBLES with fabric-covered wings in several modern high-speed types of aircraft inevitably bring up the question whether or not the covering material which has served us so well for more than twenty-five years can be counted upon to meet our needs of the near future. So long as speeds did not exceed about 150 m.p.h. there was little difficulty in getting a wing to maintain its shape with a doped fabric covering. On some early racing machines troubles were encountered, but these were overcome fairly easily by improved stitching and by a closer spacing of the ribs. These remedies did the trick for quite a long time, and it is not until relatively recently that fabric troubles have again become important.

It is, of course, quite obvious that one would not lightly discard a material which has stood the test of time so well as has doped fabric, and its advantages are many and well known. It is light, it is cheap, it is easily renewed, and it readily affords inspection of the interior of a wing. But there does seem to be a possibility that when 250 m.p.h. or even 300 m.p.h. come to be accepted as quite ordinary speeds, our old friend doped fabric may have to give way to other materials unless means can be found for reinforcing it in some way which will enable it to withstand the high loads which arise from pressures concentrated locally on a wing.

THE NEW "SWALLOW" in the AIR

Flying Impressions of the Mark II "Swallow" from the Amateur's Point of View : An Improved Undercarriage and Lower Landing Speed

By H. A. TAYLOR

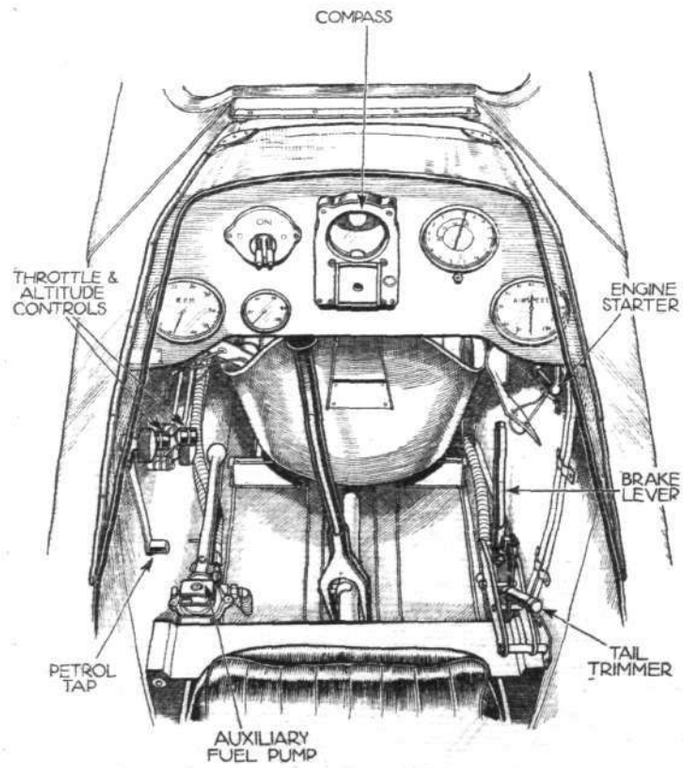
DURING the past few months there has been, both here and in America, a distinctly greater interest shown in the possibility of producing an aeroplane which is both simple to fly and proof against the effects of careless handling, types have been and are being made which incorporate almost entirely new ideas—and there is a tendency to overlook the fact that the conventional aeroplane can, provided that certain unnecessary qualities are dispensed with, be both simple and safe.

Meanwhile, the British Aircraft Manufacturing Co.'s "Swallow," without any special devices, continues to do very nearly everything that is claimed for the novelties, while possessing a speed range which is remarkable when its comparatively low power and very low wing-loading are remembered. Of course, it has to be piloted, and the number of major controls remains unaltered, but at least one keen novice, unable to go solo on other machines, has been sent off on the "Swallow" by himself without giving his instructor a permanently weak heart.

Apart from certain slight structural changes, which give the new machine a more austere appearance, and which have been made for production reasons, the Mark II "Swallow" has been modified in several very important ways.

Remembering the ability of the machine to sink under control at speeds very little higher than the true stalling speed, and also the fact that it is likely to be flown often by pilots of little experience, the improvement and strengthening of the low-drag undercarriage can be considered to be the most important. While the track and the actual movement remain the same, the construction is such that the undercarriage has virtually been moved forward, and improved damping has also given the effect of greater movement. The legs are now attached directly to the front wing spar and each radius arm to the sliding half of the leg at a point near the wheel spindle. The result is that, as the undercarriage takes the load, the legs must swing forward.

In order to tidy the cockpit interiors and to strengthen the whole forward section, the latter now has a double skin. Incidentally, the seats are now detachable, being mounted at the front in each case on a duralumin bracket attached to a spar and at the rear to the decking. Both tail trimmer and brake levers, which operate on the same fulcrum, are carried on a rigid unit which allows of no movement under the stress of brake application. On the left is the Zwicky hand pump to supplement, if necessary, the mechanical pump which lifts the fuel from the wing tank—or tanks—to the gravity tank behind the engine.



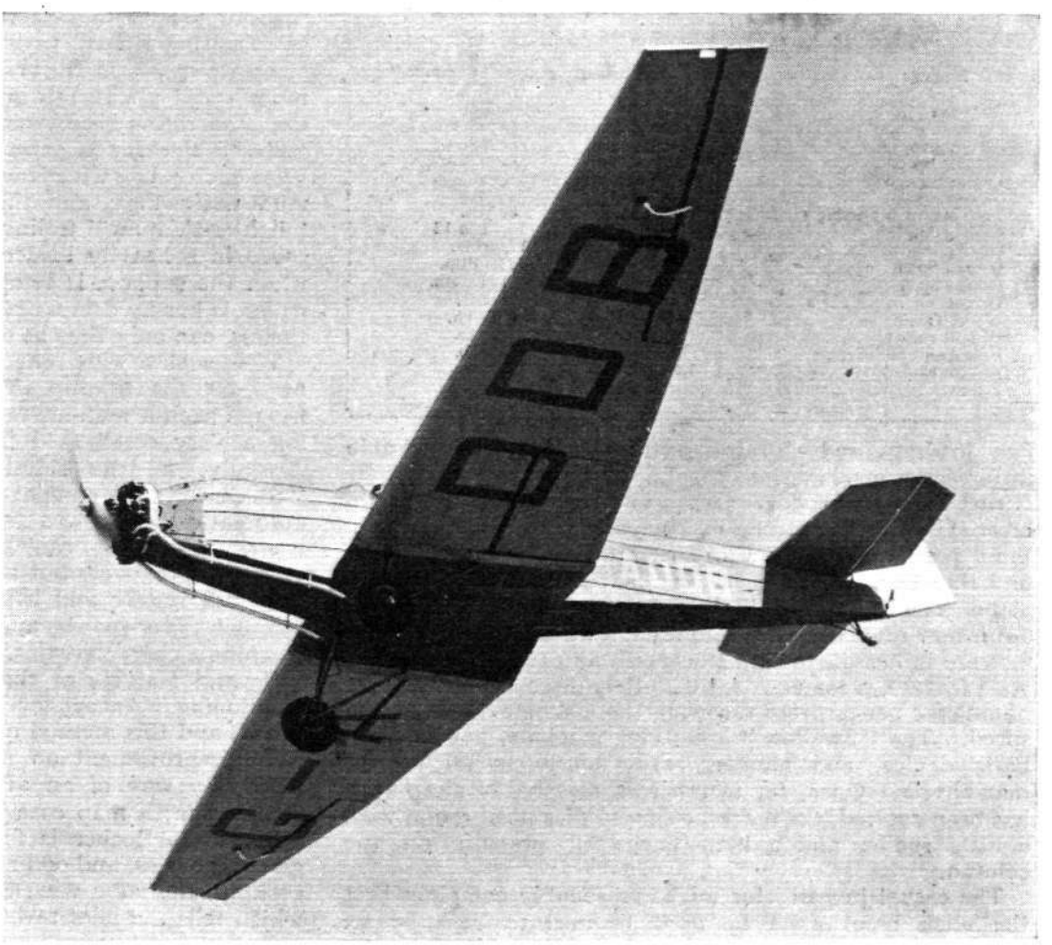
Since the inner walls of the new "Swallow" cockpits are ply-covered the interior is particularly tidy. The neat grouping of the instruments, including the compass, is noteworthy.

In previous "Swallows" the tail plane was adjustable on the ground for general trim at both the front and the rear. The forward mounting is now the fulcrum point, and all adjustments are made at the rear. As the elevator is operated by cables which meet at the fulcrum point, adjustments do not upset this control. The actual operation of the elevator is made through a single crescent-shape arm immediately behind the hinge centre. The leading edge of the tail plane is now embedded in the decking so that the air flow is quite unbroken.

The ingenious arrangements which, by means of a main pin-withdrawing lever and an auxiliary catch

released by a wire from the wing tip, allow the folding process to be carried out single-handed remain unaltered.

To the amateur pilot, brought up on conventional machines, the most attractive feature of the "Swallow" is its ability to float about the sky with the engine either throttled right back or even—there being a direct cable-operated hand starter in the cockpit—switched off. The man or woman who treats flying more as a means of relaxation does not always wish to hurry from here to there, but often prefers to enjoy quietly the blessings of flight and to look at the ground in comfort. With the "Swallow" it is possible to cruise gently at 50 m.p.h. or less, and to glide with a dead stick at about the same speed without either helmet or goggles and disturbed only by the merest rustle of wind. The new screens are particularly deep and allow one to fly at all times without goggles.

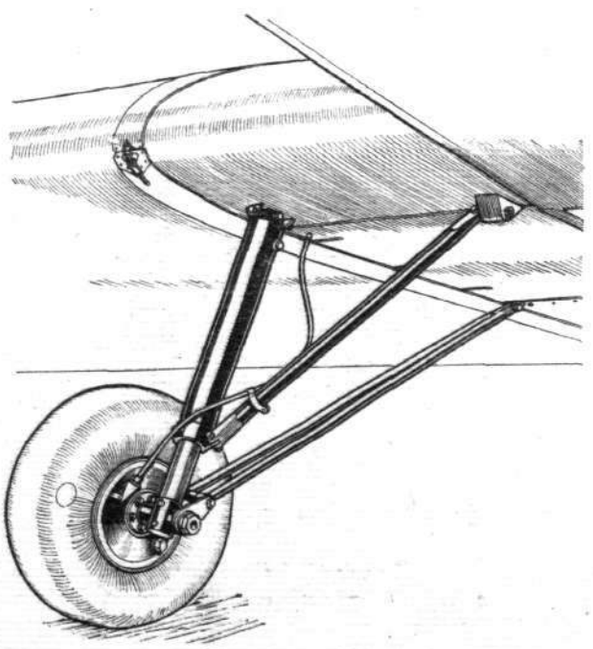


In its new form the "Swallow" has attractive, if relatively austere, lines, while retaining the distinctive appearance of the type.

On the day when the new Mark II "Swallow" was flown by the writer the wind was probably gusting up to 25 m.p.h., and the approaches were made rather faster than would normally be necessary. Even so, crossing the Hanworth boundary at an air speed of 60 m.p.h., the machine lost speed rapidly and showed little disposition to float. Conditions near the ground were on the rough side and showed up the ample lateral control at very low speeds. Both aileron and elevator control remained until the moment of touching down, though the rudder, perhaps, faded out just before the final stall.

Once down the machine stayed down and the new undercarriage gave the impression that a very bad landing indeed could be made without jar. Certainly, while taxying, ground irregularities passed unnoticed, and an unintentional wheel landing—the result of holding-off too near the ground in the rough conditions—resulted only in a very gentle bounce which might comfortably have been left to look after itself. The width of the undercarriage meant that taxying in a strongish side wind held no terrors. Incidentally, the slow sinking speed allows the novice to hold off quite high if he prefers.

The actual approach has its own peculiarities, which can be put to really good use, and an hour or so in the "Swallow" will teach an owner all he needs to know about safe approach methods for all types of field or aerodrome. Under good conditions it would be safe to throttle down near the boundary and to hold the machine in a sinking glide at 40 m.p.h. or less until within fifty feet or so of the ground, when a little more speed might be required for ground current changes. Probably the best gliding speed for distance is between 55 and 60 m.p.h., but this naturally varies with the strength of the wind. Certainly, at about 50 m.p.h. the glide, with Flt. Lt. J. B. Wilson, the company's chief pilot, from 3,000 feet, where photographs had been taken, was pleasantly interminable.



The major modification to the undercarriage, by which the radius arms are now attached to the moving portion of the leg, is clearly shown in this sketch.

There is, in fact, no speed below which it is really unsafe to fly. Experiments at a safe height showed the stalling speed to be well below the 30 m.p.h. which was the lowest recorded on the A.S.I. At this speed the application of full rudder started a steady turn, and full rudder with the stick right back, at possibly 25 m.p.h., merely caused the machine to execute a steep and rapidly corrected spiral in the direction of application. Short of suicide tactics near the ground, it should be impossible to get into trouble with the "Swallow," though, with cer-

THE B.A. "SWALLOW" MARK II.

Engine:	British Salmson. 70/75 h.p.	Pobjoy "Cataract." 75/85 h.p.
Duration	4.8 hr.	4.5 hr.
Range	420 miles	420 miles
Maximum speed	102 m.p.h.	110 m.p.h.
Cruising speed	90 m.p.h.	98 m.p.h.
Landing speed	25–30 m.p.h.	25–30 m.p.h.
Take-off (solo)	40 yds.	40 yds.
Take-off (with passenger)	53 yds.	50 yds.
Gliding Angle	1 in 12	1 in 12
Ceiling	16,000 ft.	17,000 ft.
Overall Span	42 ft. 8½in.	42 ft. 8½in.
Folded Span	13 ft. 9in.	13 ft. 9in.
Height	7 ft.	7 ft.
Wheel Track	6 ft. 3in.	6 ft. 3in.
Weight empty	960 lb.	930 lb.
Passenger and luggage	219 lb.	249 lb.
Weight loaded	1,500 lb.	1,500 lb.
Price	£715	£725

tain loadings and elevator settings, one might be able to force the machine into a spin.

Although the rudder area has been only slightly increased, this control is, nevertheless, very much more positive than in the earlier types—a fact which is probably accounted for by the better flow over the tail plane. The rudder is still the lightest of the three controls, but is now more nearly harmonised. The ailerons, of course, increase in heaviness with the speed, and this is probably a good feature, inasmuch as it definitely discourages the most ham-fisted person from throwing the machine about at top speed. The "Swallow" is a flying machine, not an aerobatic device, and handles really nicely in all normal manœuvres. Once, for instance, a reasonably steep turn has been entered, the machine simply flies itself round with a little rudder and a little backward pressure on the column.

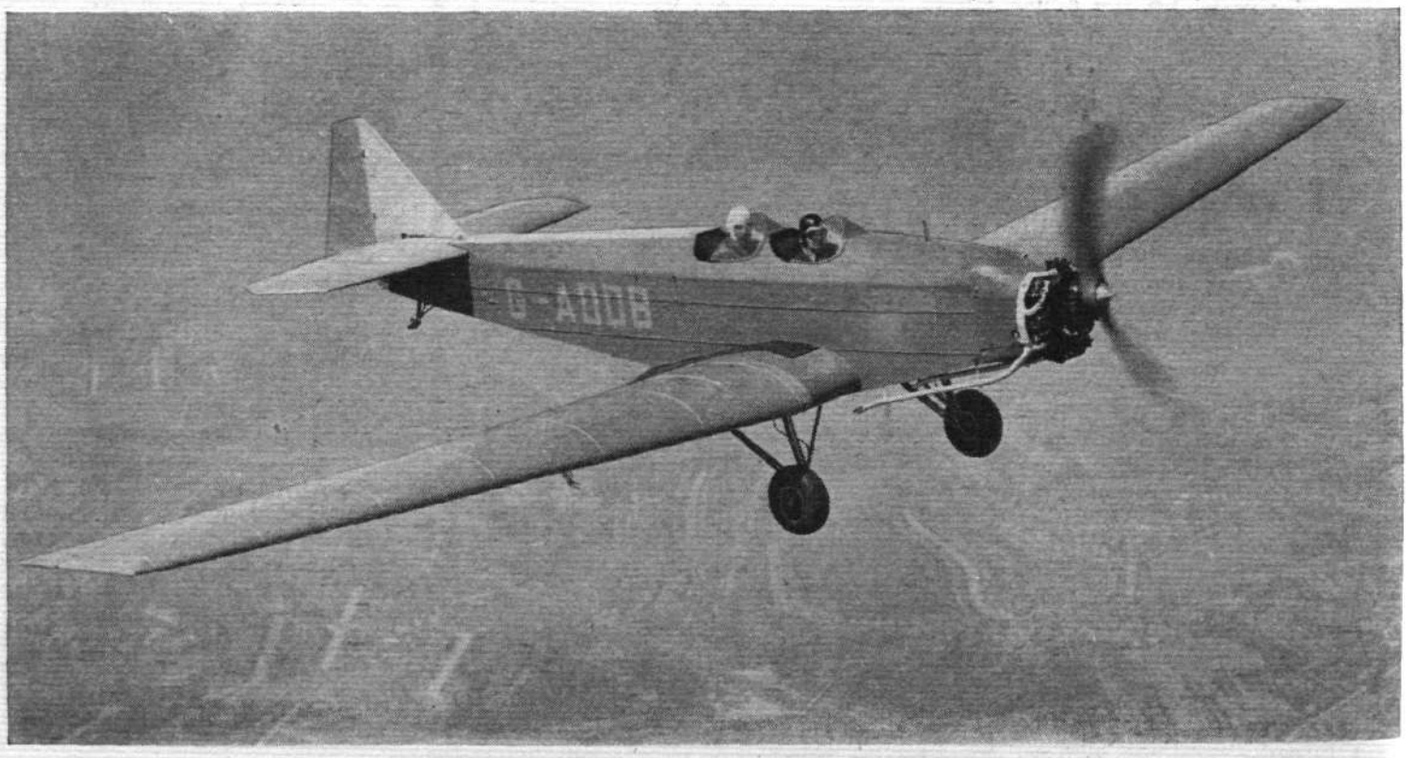
The casual investigator might reasonably complain that the stick hand must be used to operate the elevator trimmer, which is on the right, alongside the brake lever. In actual fact the loadings are so small that this lever can be comfortably left in one position from the moment of opening up on the ground, and during the test, with two up, it was only moved while obtaining some idea of the cruising and maximum speeds.

It is difficult, of course, with only a normal altimeter as a guide, to ensure that a particular machine is flying absolutely level, but there appeared to be no doubt that the cruising speed, with the Pobjoy engine turning at 2,000 r.p.m., is in the region of 95 m.p.h., and the maximum speed about 110 m.p.h. From 80 m.p.h. upwards the acceleration is comparatively low though quite definite, and the machine is extremely comfortable while cruising. With such a low wing-loading, bumps are transformed into mild wallowings, and the machine has at all speeds a "lighter-than-air" feeling very different from that experienced in a heavily loaded affair which drops like a brick when the support is temporarily removed—an impression which is hardly compatible with theory, but which, nevertheless, can only thus be described.

With such a wide range of gliding speeds and angles the need for the sideslip in approach tactics is not great, though such a manœuvre might be useful when approaching a very small field in a wind of doubtful strength. Actually, a true sideslip is only possible with the "Swallow" at a comparatively high forward speed which automatically removes any advantages gained by the slip itself. The nose can be held up by the rudder at 70 m.p.h. or over, but a form of "crab" sideslip, made with full rudder and little opposite aileron, can be used at much lower speeds, and this is more in keeping with the machine's characteristics.

Several features of the standard equipment are worth mentioning. An eye-level compass is built into the dashboard, and this method of mounting, it must be admitted, is an improvement on that in which the instrument is fitted, by way of an afterthought, somewhere near the rudder bar; a map case is fitted in the pilot's cockpit; a really useful locker is fitted, and another small one for gloves, goggles, and oddments is arranged in the passenger's cockpit; the main wing tank has a rotating type of gauge which tells the pilot rather more than the fact that he has or has not got some fuel left. Incidentally, the duration is very close to five hours, which means that the machine has a fully useful range of between 350 and 400 miles and an actual range of 420 miles. Too many aeroplanes have an inadequate operating radius for modern conditions.

The new "Swallow," with its high performance and its still lower landing speed, coupled with several additional refinements, should find a number of new friends.



Although the passenger in this view is actually wearing goggles the screens of the new "Swallow" permit comfortable flying without them. Flt. Lt. J. B. Wilson, the makers' chief test pilot, is piloting the machine.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Oriental Multiplication

Japan's Air Force is to be doubled and reorganised.

Antipodean Celebration

Sir Charles Kingsford Smith is flying from Australia to New Zealand and back on a special journey carrying Jubilee mails.

Painless Extraction

Eight thousand German dentists have contributed £3,000 to the Air Sport Association for the purchase of two light aeroplanes.

For Coastal Reconnaissance

A D.H.89 (two "Gipsy Sixes") and an Avro 652 (two "Cheetahs") have been converted into coastal reconnaissance types for the Air Ministry.

Globe Galloping

The New York Office of Imperial Airways has issued a ticket to Mr. Fred A. Emerson, an American business man, for a 30,000-mile flight over Empire air routes.

A Soviet Competition

Entrants in the All-Union competition for light training and sports machines, to start from Moscow on July 15, will be required to make a 3,417-mile flight within five days.

Half-way to Midway

The forty-six American naval flying boats which left Honolulu to fly to the Midway Islands, 1,300 miles away, are believed to have landed, owing to bad weather, about half way to their destination.

Wings in the Dark

Seven machines from Croydon (including an Imperial Airways liner with 38 passengers) and a number of privately-owned and Service aircraft were over London one night last week; the civilians, of course, were watching the floodlighting.

A Parnall "G.P."

A "Pegasus" engined general-purpose machine is being built for the Air Ministry by George Parnall and Co., a firm which, it will be remembered, was responsible for several noteworthy light aeroplanes some years ago. They have since built some unorthodox experimental machines for the use of the Air Ministry.

Cleaner Autogiros

A C.30 Autogiro at Hanworth has been fitted experimentally with an extremely neat undercarriage embodying only two main members on each side of the fuselage. The Pitcairn Autogiro Company, in America, has developed something similar for its latest two-seater, which, incidentally, does 141 m.p.h. with a 420 h.p. "Whirlwind."

THE FLYING TRAPEZE: M. Rene Courtin, the French parachutist, with the equipment which he uses for low-altitude drops from a balloon. His record is 50 metres (164 ft.).

Dr. Eckener Ill

Dr. Hugo Eckener is lying ill with pleurisy.

British-built Bellancas?

Rumour has it that the Bellanca Aircraft Corporation is seeking a site for works on Tyneside.

More Take-off Power

A moderately supercharged version of the 24-cylinder Napier "Dagger," known as the "III M.S.," has been produced.

The Modern Missionary

Capt. Koehl, of Transatlantic fame, is going to Africa to improve transport facilities for the Catholic flying mission, which already has six aeroplanes.

Formidable Fairey Fighter

A single-seater fighter with a startling performance and very powerful armament is being produced by the Fairey Company for a foreign competition.

Aiding the Engineer

By compiling maps from aerial photographs engineers are studying the accumulation of silt which threatens to shorten the life of the great Boulder Dam Reservoir.

Tragic Trove

The German Government's Junkers, which was missing for some days after leaving Stuttgart, was ultimately found wrecked in the Fichtel mountains. All seven passengers were dead.

Precautionary

The Legion of Frontiersmen will give a display of "air defence and protection against chemical warfare" at Hanworth next Sunday. No. 1 Air Communication Squadron of the Legion will drill and fly past after being inspected by Maj.-Gen. Lord Loch, the President.

Black's New "Comet"

The truth behind the rumours of a "Super Comet" for Campbell Black's record attempts, mentioned in *Flight* of May 2, is that the machine will be basically similar to the "Comets" already built, but will embody all the modifications suggested during their employment.

Twenty-five Years Ago

From "Flight" of May 14, 1910.

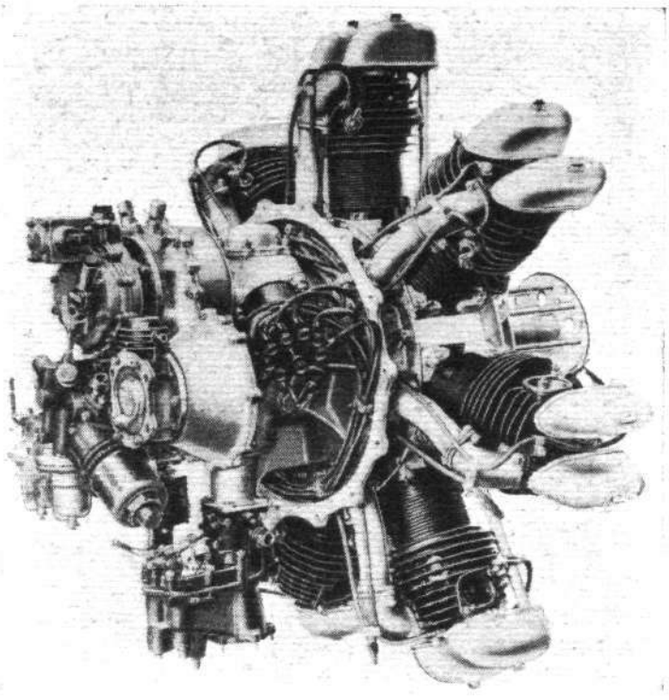
"A novel scheme has been drawn up by the German War Office with the object of providing the nation with a large aerial fleet at a minimum expense. It provides that where private owners build airships which fulfil military requirements and will undertake to place them at the Army's disposal in case of war, the government will pay substantial subsidies."

THE WOLSELEY "AQUARIUS"

A New Engine Suitable for Training Machines and "Feeder Line" Types : Sturdy Construction and Reliability Aimed at Rather Than Low Weight

QUITE a range of aero engines forms a part of the Wolseley development programme. Lord Nuffield is not a believer in doing things by halves, and he has sanctioned a programme for the next few years which should definitely place Wolseley aero engines among the world's leading aircraft power plants. The range at present contemplated includes powers from 150 b.h.p. to more than 500 b.h.p., and numbers of cylinders from seven to eighteen. All types will have this in common: they will be "blown," i.e., will have a geared induction fan or a supercharger. With one exception—the smallest engine of the family—they will also all have air-screw reduction gearing.

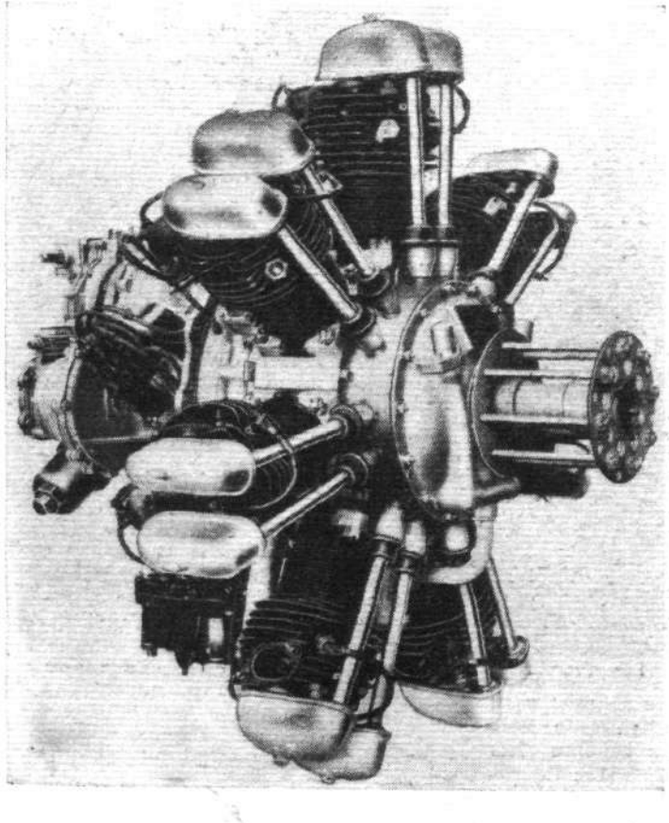
A recent visit to the Ward End, Birmingham, works of the company disclosed the fact that a considerable reorganisation has taken place, and that further extensions are likely to be made in the near future. The aero engine section of the huge Wolseley works is now a self-contained unit with drawing office, shops, etc., removed from the motor car shops and so situated that work can proceed rapidly and with a maximum of efficiency.



This three-quarter rear view of the "Aquarius" shows the compact grouping of the equipment on the back of the engine. At the foot of the page is a front view.

Wolseley "Aquarius"

Type: 7-cyl. air-cooled radial.
Bore: 4 3/16 in. (*106 mm.*).
Stroke: 4 3/4 in. (*120 mm.*).
Capacity: 458 c. in. (*7 507 c.c.*).
Compression ratio: 5.35 : 1.
Normal speed: 2 250 r.p.m.
Max. speed: 2 475 r.p.m.
Power at normal speed: 155 b.h.p.
Power at max. speed: 170 b.h.p.
Airscrew drive: Direct.
Direction: Right-hand tractor.
Fuel consumption at 75 per cent. of max. power: 0.54 pt./b.h.p./hr. (*0,306 litres/b.h.p./hr.*) = 8.6 gals./hr. (*39 litres/hr.*).
Oil consumption: 1.5–3 pt./hr. (*0,85–1,70 l./hr.*).
Weight: 375 lb. (*170 kg.*).
Specific weight: 2.2 lb. hp. (*0,986 kg/CV*).
Overall diameter: 40 1/4 in. (*1 020 mm.*).
Overall length: 36.4in. (*925 mm.*).



Of the several models actually in being or coming along little may be said at present, as it is desired to get every model through its type tests first, but in a general way it may be taken that the seven-cylinder engine which forms the subject of this article is typical, except for minor differences, of the whole range of engines.

The Wolseley "Aquarius," as the new engine is called, is a seven-cylinder air-cooled radial of fairly orthodox design, in which robustness of construction, reliability, and long periods between overhauls have been aimed at rather than very low specific weight. This policy should be a very sound one in view of the fact that the engine has been designed specifically with the object of being suitable for installation in training aircraft, where a hard-wearing power plant is particularly needed. The "Aquarius" is, however, also very suitable for the smaller class of commercial aeroplanes of the twin-engined type, in which a total horse-power of 300-350 suffices.

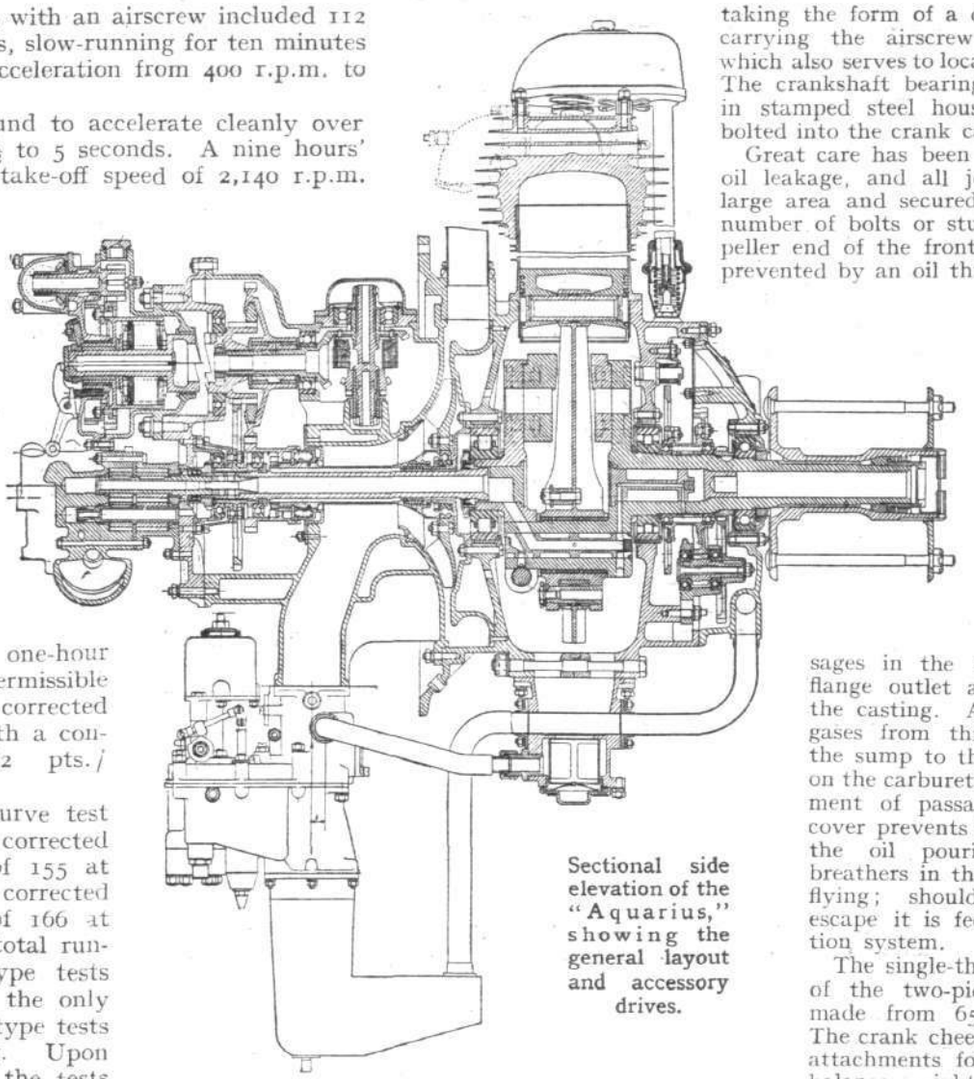
The "Aquarius" passed its Air Ministry type tests in a most satisfactory manner, the tests being extended to cover a 100-hour endurance test. During the forty-hour run on the water brake at 90 per cent. of the rated power the maximum cylinder head temperature was 193 deg. C., and at full throttle 196 deg. C. This was followed by a fifty-hour endurance run driving a calibrated test airscrew. During this run the maximum cylinder head temperature at 90 per cent. power was 171 deg. C., and at full throttle the figure was 174 deg. C.

The preliminary power curve showed a corrected full-throttle b.h.p. of 157 at 2,250 r.p.m. (the normal speed), and 170 b.h.p. at 2,475 r.p.m. (the maximum speed). The throttle curve gave an observed b.h.p. of 128 at 2,250 r.p.m., with a petrol consumption of 0.54 pint per b.h.p./hr. From the detonation power curve the corrected full-throttle b.h.p. was found to be 158 at 2,250 r.p.m., and 171 b.h.p. at 2,475 r.p.m. Power-consumption curves were taken at 50, 70, and 90 per cent. of full power.

Throttle-curve runs with an airscrew included 112 starts and 50 backfires, slow-running for ten minutes at 400 r.p.m., and acceleration from 400 r.p.m. to 2,500 r.p.m.

The engine was found to accelerate cleanly over this range in from 1½ to 5 seconds. A nine hours' endurance test at a take-off speed of 2,140 r.p.m. gave a corrected full-throttle b.h.p. of 149, with a fuel consumption of 0.563 pints per b.h.p. per hour. This run was followed by a one-hour run at normal speed and full throttle, in which the corrected b.h.p. was 155.6 with a consumption of 0.588 pints per b.h.p. per hour. A one-hour high-speed test at 2,600 r.p.m. followed, and then a one-hour test at maximum permissible revs., in which the corrected b.h.p. was 167.7, with a consumption of 0.562 pts./b.h.p./hr.

Finally a power curve test was taken, giving a corrected full-throttle b.h.p. of 155 at 2,250 r.p.m. and a corrected full-throttle b.h.p. of 166 at 2,475 r.p.m. The total running time for the type tests was 113 hours, and the only breakage during the type tests was one valve spring. Upon being stripped after the tests the working parts were found to be in good condition, all parts being serviceable for further use.



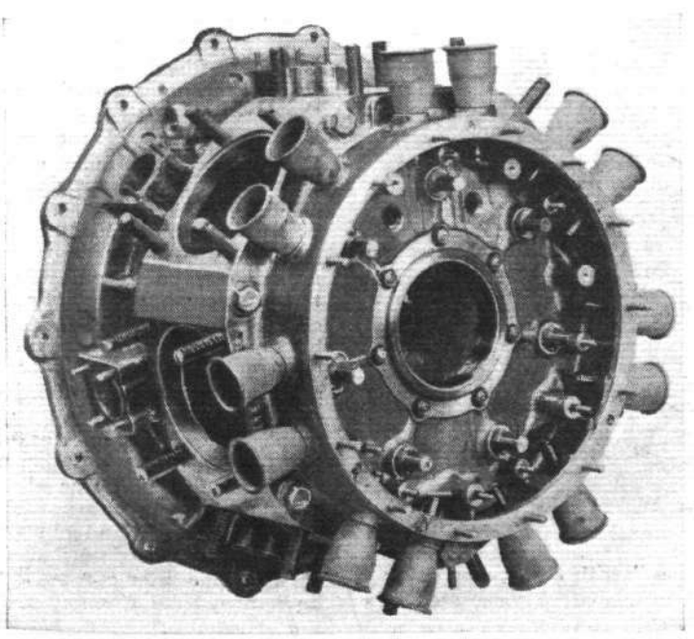
Sectional side elevation of the "Aquarius," showing the general layout and accessory drives.

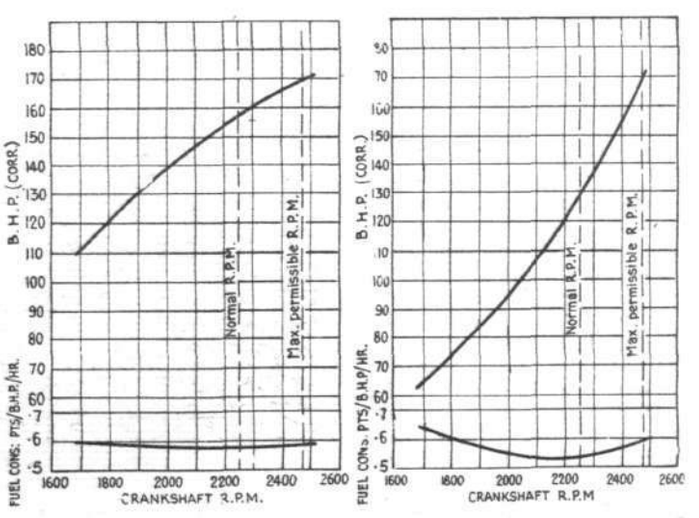
The crank case is produced from heat treated aluminium-alloy castings. It is made in two halves split transversely along the centre lines of the cylinders. A flat plate permanently secured to the rear half of the crank case forms one side of the diffuser passage of the induction system, the other side of this passage being formed by the flange of the fan induction chamber. A circular flange by which the engine is attached to the aircraft forms an integral part of the crank case rear half. The front half of the crank case forms the housing for the timing gear, which is closed by a front cover taking the form of a domed diaphragm carrying the airscrew thrust bearing, which also serves to locate the crankshaft. The crankshaft bearings are all carried in stamped steel housings shrunk and bolted into the crank case diaphragms.

Great care has been taken to prevent oil leakage, and all joint faces are of large area and secured by an adequate number of bolts or studs. At the propeller end of the front cover leakage is prevented by an oil thrower in conjunction with an efficient oil return thread. A large breathing chamber is formed in the front cover and the gases, after passing through a gauze of large area, find their way to the top of two breather pots and thence down tubes and control passages in the front cover to a flange outlet at the bottom of the casting. A pipe carries the gases from this outlet through the sump to the air intake pipe on the carburetter. The arrangement of passages in the front cover prevents any possibility of the oil pouring out of the breathers in the case of inverted flying; should any lubricant escape it is fed into the induction system.

The single-throw crankshaft is of the two-piece type and is made from 65-ton alloy steel. The crank cheeks extend to form attachments for the forged steel balance weights, each of which is secured by two steel bolts in addition to a location register. The maneton is attached to the crank-pin by means of a key and clamped eye, the pinch bolt being of a definite length, so that when the nut is tightened the stress in the bolt can be limited by measuring the amount of extension. The crankshaft is carried in three bearings, comprising one ball bearing in the front cover and a roller bearing in each half of the crank case.

Cylinders of composite construction are used, each barrel being a carbon steel forging machined all over and provided with close-pitched, shallow fins. The cast aluminium alloy cylinder head is secured to the barrel by means of a shrunk and



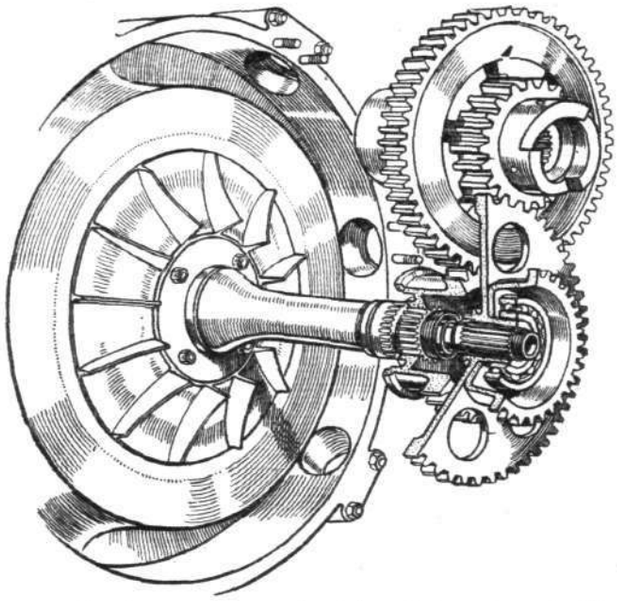


(Left) The crank case assembly with front cover removed. Note the cups which receive the push-rod enclosure tubes. (Above) The power curve and throttle curve.

screwed joint, and a steel band having two fins is pressed on to the lower end of the head to reinforce the joint and to prevent any leakage or pressure at working temperatures. The heads have horizontal fins, and each carries two valves, inlet and exhaust, being alike and interchangeable. They are of high nickel high chromium steel and operate in hard phosphor-bronze guides. Two bosses on the top of the cylinder head are provided for stud attachment of brackets to support a ring cowling. The valve seats are screwed and shrunk into the cylinder head.

The valves are operated by rockers carried on hardened steel needle roller bearings. The end of the rocker which makes contact with the valve stem is provided with a hardened steel roller running on a hardened steel pin. Double springs are provided for each valve and the valve stems have hardened ends to reduce wear due to the action of the rocker. The whole of the rocker gear on the cylinder head is enclosed by two pressed aluminium covers of streamline form, attached by self-locking thumb screws. Grease-gun lubrication is provided for the rockers.

At the lower end of the cylinder is a deep spigot and a flange, and attachment to the crank case is by means of four substantial steel clamps held by studs in the case. Two sparking plugs per cylinder, carried in bronze adaptors, are fitted. An additional boss is provided which can be used for fitting either a compressed air or gas starter valve.



Details of the induction fan drive of the "Aquarius." The fan is mounted on a sleeve which is driven through the medium of the shock-absorbing centrifugal clutch pinion.

Connecting-rod Assembly

The connecting-rod assembly comprises the usual master rod and auxiliary rods. All are of H-section and produced from 65-ton alloy steel. Hard phosphor-bronze bushes are used for both the gudgeon-pin and wrist-pin ends. The auxiliary rods are attached to the master rod big end by hardened steel wrist-pins, at one end of which is formed a taper which fits into a correspondingly formed hole in one web of the master rod.

The pistons are heat-treated aluminium alloy drop forgings and are of the fully skirted type. They are machined all over, and each is provided with two compression rings and two scraper rings, one of the latter being of the oil control type. Radial holes are provided at each of the scraper rings for the return oil. The hardened gudgeon-pin is arranged to float both in the small end of the connecting rod and in the piston bosses. Endways movement of the gudgeon pin is prevented by circlips.

A very simple valve-operating gear is employed. A single four-lobe cam is used, driven at one-eighth engine speed and in the same direction as the crankshaft. The drive for the cam is by means of a double train of hardened steel spur gears, the layshaft and the cam carrier both running on ball bearings. As a single cam operates both the inlet and the exhaust valves, the valve period is the same for both. To provide a fine angular adjustment of the timing a vernier attachment is provided between the cam gear and its carrier for valve timing.

The tappets, which are carried in long bronze guides, are actuated by the cam *via* roller-ended rockers pivoting on hardened steel spindles attached to the front wall of the crank case. The push rods are of tubular form and provided with hardened steel cups at each end. They are enclosed in aluminium tubes, an effective oil seal being provided at the crank case end by cups covered by oil-resisting rubber sleeves.

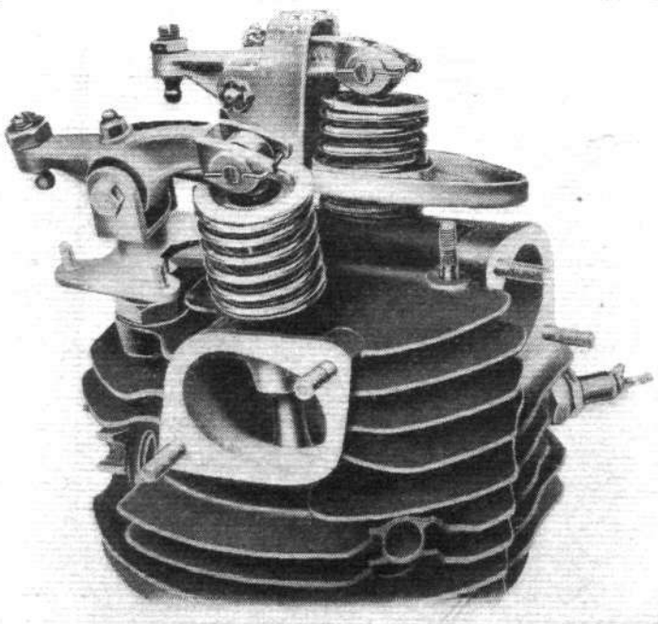
Included in the induction system is a fan revolving at 3.8 times the speed of the crankshaft. A spring drive is incorporated which prevents shock from being transmitted to the fan when sudden changes of engine speed occur. A rearward tubular extension of the crankshaft possesses considerable flexibility and in itself produces a considerable degree of damping. The fan shroud has a rearward projection in the form of a sleeve concentric with the driving shaft and running over it. A gear on the crankshaft extension provides gearing-up by an intermediate gear placed above it, this gear containing a centrifugal type of clutch which slips under sudden changes in load. From this intermediate gear a further step-up in gearing is provided for the sleeve of the induction fan, as shown in the accompanying drawing. Although a fan running at nearly four times engine speed is not to be regarded as a supercharger, it does provide slight positive pressure in the induction pipes, buts its object is to serve as a mixer in order to obtain good distribution.

The carburetter recommended by Wolseley Motors is an S.U. type A.V.18, which is operated by a single throttle lever, the altitude control being entirely automatic. Altitude correction is controlled by a corrugated capsule similar to those used in aneroids.

Spring-driven Magnetos

Dual ignition is provided by two B.T.H. magnetos of the S.G.7 type, attached to the fan induction casing close to the crank case. A patented form of spring drive is incorporated, and takes the form of a large clock-type spring, the outer end of which is attached to a sleeve secured to the driving shaft, while the other end engages with an extension of the magneto driving bevel. A stop is provided to limit the amount of angular displacement.

A dry-sump lubrication system is employed, both pressure and scavenge pumps being assembled as a unit and driven at engine speed from the rear end of the tail shaft. The pumps are of the spur gear type, the driving gears being of steel and the driven gears of phosphor-bronze. The pressure pump delivers 2.26 gallons of oil per hour at normal engine speed, while the scavenge pump has a capacity of 4.62 gallons per hour. The pressure pump casting has a Tecalemit filter chamber containing a fabric-covered filter element of ample size. The interior of the filter element contains a relief valve which opens when the difference in pressure between the inside and outside of the filter exceeds 6 lb. per sq. in. The filter can readily be removed for cleaning and the normal running period

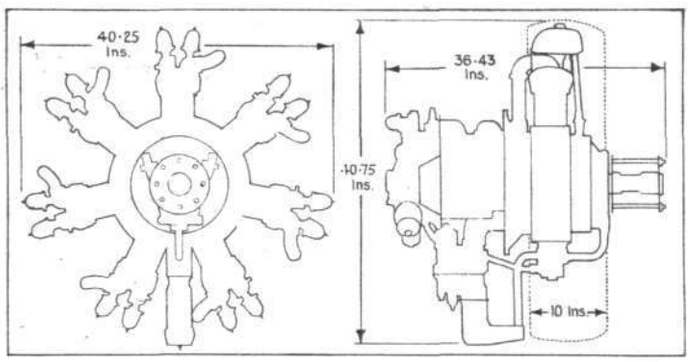


A cylinder head of the "Aquarius" with the rocker cover removed. Bosses for cowling brackets are incorporated in the casting.

before this becomes necessary is approximately one hundred hours. All auxiliary drives are lubricated by a bleed from the oil jacket round the induction chamber.

Provision has been made for the fitting of an Amal duplex diaphragm petrol pump and B.T.H. air compressor when specially ordered. These components are bolted directly to the rear cover, the petrol pump on the lower port side and the air compressor on the starboard side. The drive of the latter incorporates a shear pin.

At the rear of the engine a circular flange is provided for the attachment of the starting gear. Either the Wolseley hand-turning gear or an Eclipse inertia starter can be fitted. Starting under extreme conditions of cold can be facilitated by the use of a priming system comprising a ring pipe formed at the rear of the engine, and having connections to each spray nozzle on the cylinder heads, the ring pipe being coupled to the priming pump.



Installation diagram of the "Aquarius."

MORE ATTRACTIONS on EMPIRE AIR DAY

What the Various R.A.F. Units are Planning

NEWS of stirring displays and instructional exhibitions to be staged on Empire Air Day, May 25, continues to arrive.

At the Royal Air Force Armament School, Eastchurch, Kent, "Harts," "Bulldogs," "Wapitis" and "Gordons" will be paraded for public inspection, after which they will take part in demonstrations of the bombing of targets represented by camera obscura and Hill's mirrors, supply dropping, and the bombing, from a high altitude, of a target on the aerodrome. The exhibition of flying training will include camera gun exercises by machines flying over the aerodrome and a mock attack by aircraft using camera guns against similar weapons on gun rings manned in the centre of the aerodrome. As a *finale* there will be a low bombing and front gun attack which will end with an incendiary bomb attack on a ground target. Visitors will also be permitted to inspect bomb loading equipment, Vickers and Lewis guns, dummy bombs ranging from 5 oz. to 3,000 lb., a 1½-pounder quick-firing aircraft gun, a "bombing teacher," a camera obscura, and other items of a similar nature.

Northolt will present a continuous flying programme illustrating various stages of training. At this station are Nos. 111 and 41 (Fighter) Squadrons, equipped, respectively, with Bristol "Bulldog" single-seaters and Hawker "Demon" two-seater fighters. One of each of these types will be available for public inspection, and other aeroplanes on exhibition will include a Westland "Wallace," a "Hart (Communication)," an Avro training machine, a "Moth," and a Hawker "Tomtit." Various forms of aircraft equipment will be on view, and in the workshops there is to be a demonstration of aircraft and engine overhaul.

Photographic "Ground Strafing"

Normal service flying training will be done in the neighbourhood of Castletown, Sunderland (Durham), by No. 607 (County of Durham) Bomber Squadron. Individual flying training and flight formation training will also take place. Wireless communication between the air and the ground is to be demonstrated, and there will be a mock battle between aircraft and an attack from the air on a ground target by "Wapitis" equipped with camera guns. The most interesting parts of the station will be on view, and the types of aircraft available for inspection will include "Wapitis," Avro training machines and "Moths" equipped for night flying. There will be a formation flight by three "Wapitis" over Cramlington civil aerodrome, near Newcastle, at about 4 p.m.

At Abbotsinch, Paisley, No. 602 (City of Glasgow) Bomber Squadron will perform aerobatics, mock air fights, and bombing practice on the aerodrome. Visitors will be allowed to watch inside the camera obscura hut to see how the results of mock bombing attacks are assessed. A demonstration of blind flying instruction will be given, and "Harts" will be seen testing their front guns on the machine gun stop butts. While visitors "listen in" in a hangar, a flight of aircraft will communicate with the wireless telephony section. A "Hart," an Avro and a "Moth" will be on view, equipment will be available for inspection, and most of the interesting aerodrome buildings will be open to the public.

At Boscombe Down, the home of Nos. 9 and 10 Bomber Squadrons, the programme will include demonstrations of flying training and, weather permitting, camera obscura practice, camera gun practice, air navigation and photography. Handley Page "Heyfords" and Vickers "Virginias" will be on view, and many sections of the aerodrome buildings will be open, including a "crew room" with navigation instruments and maps.

A feature of the display to be given by No. 5 Flying Training School at Queen's Ferry, Sealand, Chester, will be a formation flight of twenty-four aircraft composed of "Atlas," "Tutor" and "Bulldog" machines, which will pass over Speke Airport, Liverpool, at 10 a.m. and 1 p.m., and over Hooton Park aerodrome, Cheshire, a few minutes later. During the afternoon the station, at which *ab initio* pupils are taught to fly, will carry out its normal routine. Various parts of the aerodrome buildings will be open, and "Bulldogs," "Atlases" and "Tutors" are to be available for public inspection.

The two Fighter Squadrons, Nos. 23 and 32, stationed at Biggin Hill, Kent, will give a demonstration of air drill. Two aircraft of No. 32 Squadron will give an aerobatic display and "A" flight of the same Squadron will make an attack on a towed target. One flight will fly over the airports at Maidstone, Rochester and Gravesend. During the afternoon No. 23 (Fighter) Squadron, which flies Hawker "Demons," will demonstrate air drill, aerobatics, message dropping, attacks and forced landing practice. Guides will conduct visitors through several of the aerodrome buildings.

An item of particular interest at the R.A.F. Cadet College, and the Electrical and Wireless School, Cranwell, Lincolnshire, will be a demonstration of a Vickers "Valentia," equipped as a flying classroom, in which apprentices will undergo wireless training. A "Hart" will give an aerobatic display, and a "Tutor" will pick up messages from the ground with a hand grapnel. Two other aircraft of this latter type will perform the well-known "instructor and pupil" act. In addition, a flight of "Harts" will do formation flying, a "Bulldog" will give an aerobatic display, and there will be a formation of seven or nine "Tutors." Wireless communication between the air and the ground and vice versa will be explained and demonstrated, and a yellow "Tutor" will lay a screen of "gas" provided by electrically fired smoke bombs, while airmen in the vicinity will be seen taking anti-gas precautions. One "Hart," equipped with apparatus for dropping supplies, will deposit a case of one dozen bottles of beer, which will afterwards be sold in aid of the Royal Air Force Benevolent Fund. Each type of aircraft in the display or stationed at Cranwell will be on exhibition in the aircraft park. Military and aircraft equipment, the hangars, the Command church, and the College grounds will be open for inspection, but the College itself will not be on view.

Touring to Switzerland

From the Swiss Aero Club we have received a most useful guide for the air tourist who might be attracted towards the country. Details of the club and full particulars, with plans, of the various aerodromes are given with a complete air map showing their position.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

CENTRAL FLYING SCHOOL CATEGORIES

The undermentioned officers and airman pilots, who attended the Flying Instructors' Course at the Central Flying School from December 3, 1934, to March 9, 1935, have been categorised as follows:—

A.2

F/O. G. D. Stephenson.

B

F/O.'s C. E. J. Baines, C. F. Birks, G. A. Bolland, K. B. B. Cross, R. C. H. Crosthwaite, W. R. Farley, R. C. Gaskell, D. McC. Gordon, W. E. Hooper, R. B. Lees, L. J. Neale, W. E. Rankin, F. S. Wakeham, Sgts. Corden, W., Jones, J. H., Neal, G. P., Parr, R., Pitcher, D. J.

C

F/O.'s J. B. Altham, D. J. Alvey, G. N. Snarey, Sgts. Alexander, R., Setchell, R. G.

The undermentioned officers have been recategorised:—

A.2 to A.1

Flt. Lt. J. Cox, F/O. H. V. Satterly, Sgts. Middleton R., Jenner, W. C. A., Whitwell, J. M.

B to A.2

Flt. Lts. J. A. C. Stratton, R. C. Jonas, J. Constable-Roberts, W. I. H. Burke, F/O.'s J. B. Tatnall, C. S. Moore, A. F. McKenna, P. Heath, R. V. McIntyre, Sgts. King, H. J., Berry, F. W., Strugnell, A., Hart, J., Bowen, E., Grout, D., Skinner, H. W. C.

C to B

F/O. R. G. Harman.

GORDON SHEPHARD MEMORIAL PRIZE ESSAY

The awards in the 1934 competition for the Gordon Shephard Memorial Prizes are shown below. The competition is open to all members of the Royal Air Force for essays on reconnaissance and kindred subjects.

The Memorial Essay Prizes were established by Sir Horatio Hall Shephard, in memory of his son, the late Brigadier-General G. S. Shephard, D.S.O., M.C., R.A.F.

1st Prize: F/O. (Lieutenant, R.N.) N. Mc.I. Kemp, No. 812 (Fleet Torpedo Bomber) Squadron, Malta. *2nd Prize*: Group Capt. T. L. Leigh-Mallory, D.S.O., No. 2 Flying Training School, Digby. *3rd Prize*: Flt. Lt. W. A. Tattersall, No. 6 (Bomber) Squadron, Ismailia.

ACCIDENT ON THE "COURAGEOUS"

Ordinary Seaman William Morrison Jamieson, 21, was killed by an aeroplane propeller on H.M.S. *Courageous* off Spithead on Wednesday night, May 8.

Preparations were being made for the last flight of the evening from the aircraft-carrier, and members of the crew were steadying an aeroplane by holding on to the wing-tip. After being relieved by another seaman, Jamieson was walking away, when the slipstream of another machine caused him to fall into the revolving propeller of the machine behind him. Jamieson, who joined the Service last autumn, was a native of Dunkeld, Perthshire.

A CASUALTY IN IRAQ

A "Wapiti" bomber of No. 55 (Bomber) Squadron was reported shot down by tribesmen whilst flying over the district of Diwaniyah in the Middle Euphrates on May 8. There have recently been tribal disturbances in this area, but the flight of this "Wapiti" was in no way concerned with them. The machine crashed in the desert and burst into flames. The pilot, P/O. Stanley John McNab Newman, and his passenger A/C.2 Alfred Edward Hawkins, were both killed. The bodies were brought in to Hinaidi for burial. The father of P/O. Newman lives at Chorley Wood, Hertfordshire.

CRANFIELD AERODROME

The Air Ministry is to take possession on June 24 of the 400 acres of land at Cranfield, Beds, for the acquisition of which provision was made in the Air Estimates. The work of preparing the site as an Air Force station will begin almost at once, and it is expected that building will have begun by the autumn. The new station is intended to provide accommodation for three squadrons.

STUDY OF MODERN FOREIGN LANGUAGES

The undermentioned officers and airmen passed the examinations held in January, 1935:—

ARABIC

Colloquial

Sqn. Ldr. J. Cottle, M.B.E., D.F.C., Sqn. Ldr. G. J. Hanly, M.B., Ch.B., F.R.C.S. (E), Sqn. Ldr. T. C. Traill, D.F.C., Flt. Lt. L. J. V. Bates, Flt. Lt. G. A. M. Knight, M.B., B.S., Flt. Lt. J. A. Stephenson, F/O. H. Y. Humphreys, F/O. S. C. Widdows, Sgt. A. G. Haggar.

Preliminary

Flt. Lt. E. C. Lewis, F/O. A. H. Marsack, F/O. D. H. Marsack.

FRENCH

Preliminary

Flt. Lt. R. W. K. Stevens, F/O. T. U. Rolfe, F/O. L. I. T. Whitaker, P/O. J. R. Jeudwine, P/O. J. N. Knowles, Warrant Officer 2nd Class A. E. L. Endley, Warrant Officer 2nd Class W. H. M. Kimpton, Cpl. T. Heaton, L.A/C. W. J. Hall, L.A/C. D. L. Thomas.

Interpretership (2nd Class)

Requalification

Wing Cdr. G. S. M. Insall, V.C., M.C.

GERMAN

Preliminary

Sqn. Ldr. G. J. Hanly, M.B., Ch.B., F.R.C.S., F/O. D. Price, F/O. B. H. Becker, A.P/O. A. M. A. Birch, L.A/C. D. L. Thomas.

Interpretership (2nd Class)

Flt. Lt. E. C. de V. Lart.

Interpretership (1st Class)

Sqn. Ldr. L. de L. Leder.

MALAY

Colloquial

Warrant Officer H. Stanway, Flt. Sgt. A. F. Cave, L.A/C. J. Cullen, L.A/C. G. C. Fletcher, L.A/C. H. A. Smith.

PERSIAN

Colloquial

Wing Cdr. R. T. Leather, A.F.C.

RUSSIAN

Interpretership (2nd Class)

Flt. Lt. J. F. Griffiths

SPANISH

Interpretership (2nd Class)

Wing Cdr. J. H. O. Jones, Flt. Lt. F. E. R. Dixon, M.C., P/O. E. V. N. Bell (Auxiliary Air Force).

INDIA

URDU—LOWER STANDARD

F/O. M. W. L'I. LaV. Baker.

The undermentioned officer qualified as a 1st class interpreter in Japanese at the examination held in Tokyo in November, 1934:—

Flt. Lt. W. M. C. Kennedy.

STRANGE ACCIDENT AT MOSUL

The Air Ministry regrets to announce that as the result of an accident which occurred at Mosul (Iraq) Musketry Range on May 10, 1935, involving a "Wapiti" aircraft of No. 30 (Bomber) Squadron, and two armoured cars of No. 1 Armoured Car Company, Mosul, Iraq, Flt. Lt. Henry Spear Sandiford, the pilot of the aircraft, and A/C.1 John Gilbert Plevey, of No. 1 Armoured Car Company, lost their lives. L.A/C. Jack Woledge Rogers, the passenger of the aircraft, was severely injured and L.A/C. Harold Gilbert Keattch, of No. 1 Armoured Car Company received slight injuries.

Other reports state that the "Wapiti" was flying at a low altitude at the Mosul musketry range, and struck one armoured car with a wing-tip. The aeroplane was hurled round and then collided with a second armoured car.

ANTI-AIR RAID REHEARSALS

Rehearsals of the Government plans for protecting the civil population in the event of air raids are to be held in the great cities during the next few months. They will be mainly concerned with discovering to what extent the system of camouflage can be made effective. It is understood that there will be no mass drilling of the people, but urban centres will be darkened to confuse possible raiders. The British Red Cross Society has issued a statement that "For some time the society has been training doctors and voluntary workers to deal with gas attacks by air, as part of our general training scheme, to be ready for any and every emergency."

ANTI-AIRCRAFT MACHINE GUNS

It is notified in an Army Order that the King has been pleased to approve of the formation at home of the 1st and 2nd Anti-Aircraft Machine-Gun Batteries, Royal Artillery, with effect from April 1, to be brigaded with the 1st and 2nd Anti-Aircraft Brigades, Royal Artillery, respectively.

CLERKS, ACCOUNTING

It has been decided to amalgamate the sub-trades of clerk, pay accounting, and clerk, store accounting.

MATES—ISSUE OF DUTY PAY

It has been decided that airmen now under training as mates or placed under training in future shall be eligible for duty pay of 3d. a day on posting to a unit on passing out of training and not, as stated before, from the date of first assuming duty as mates.

R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee of the above Fund was held at Iddesleigh House, on Thursday, May 9. Mr. W. S. Field was in the chair, and the other members of the Committee present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Air Comdre. B. C. H. Drew, C.M.G., C.B.E., and Wing Cdr. H. P. Lale, D.S.O., D.F.C. The Committee made grants to the amount of £398 1s. The next meeting was fixed for May 23.

RE-ENGAGEMENT AND PROLONGATION OF ENGAGEMENT

The Air Force Act, 1935, which becomes operative in home commands on April 30 and elsewhere on July 31, modifies the law regarding re-engagement in two respects, namely:—

(i) Airmen may be re-engaged after eight years' service, instead of after the present minimum of nine years' service.

(ii) Airmen may be re-engaged for less than twenty-four years' service.

In order to differentiate between normal re-engagements and re-engagements for less than twenty-four years, the latter will be known as "prolongations of engagement." The use of the term "extension" will be limited, as at present, to cases in which the extended period does not exceed twelve years.

REORGANISATION OF THE ELECTRICAL AND SIGNALS TRADES

The electrical and signals trades have been in course of reorganisation during recent years and the sub-trade of electrician (instrument) has been abolished, while a new trade of instrument maker has been introduced. The trade of electrician has been merged in that of wireless operator mechanic. The duties of the obsolescent trade of electrician were, broadly, as follows:—

Maintenance and repair of all electrical gear (other than wireless and heavy electrical permanent plant). The electrical equipment of aircraft. The installation, adjustment and calibration of all instruments fitted in aircraft.

Under the revised organisation, the duties of the three other trades are as follows:—

Instrument Maker.—Testing, installation, maintenance and repair of all flying and navigational instruments, automatic controls, bomb sights, cameras, camera guns, electrical and mechanical measuring instruments, etc.

Wireless Operator Mechanic.—Testing, installation, operation, maintenance and repair of all electrical and wireless apparatus, except aircraft and electrical instruments and heavy electrical permanent plant. Visual signalling. Testing, repair and overhaul of magnetos. (*Note.*—Fitters, grade II, are responsible for the care and maintenance of magnetos.)

Wireless Operator.—Operation of all wireless apparatus, minor repairs to such apparatus, and the operation of accumulator charging plant. Visual signalling.

ROYAL AIR FORCE GAZETTE

London Gazette, May 8, 1935

General Duties Branch

The following are granted permanent commissions as Pilot Officers on probation with effect from and with seniority of April 30:—Sgt. W. W. Loxton, Sgt. D. O. Finlay, Sgt. K. G. Stodart, Sgt. N. F. Simpson, Sgt. E. F. E. Barnard.

The following Flying Officers are promoted to the rank of Flight Lieutenant:—A. N. Luxmoore (March 15); M. Q. Candler (April 11); G. K. Fairtlough (April 12).

The following Pilot Officers are promoted to the rank of Flying Officer:—A. J. Kennedy (Feb. 14); F. M. C. Corelli, E. B. King, C. C. House (March 12); P. C. Lawrence (April 2).

P.O. A. N. Luxmoore is promoted to the rank of Flying Officer (March 15, 1931) (substituted for the notification in the *Gazette* of June 9, 1931); Wing Cdr. E. J. Hodsoll, C.B., is placed on the retired list at his own request (May 1); Sqn. Ldr. S. E. Lindop is placed on the retired list on account of ill-health (Feb. 25); Flt. Lt. L. C. Barling is transferred to the Reserve Class A (May 1).

Medical Branch

Flt. Lt. J. S. Carslaw, M.B., Ch.B., is granted a permanent commission in this rank (May 8).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

H. M. Goodwin is granted a commission as Pilot Officer in Class A on resigning his commission in the Auxiliary Air Force (May 8); F/O. M. F. Ogilvie-Forbes is transferred from Class AA (ii) to Class C (April 19); P/O. on probation R. C. Thorn is transferred from Class C to Class AA (ii) (March 6); F/O. F. C. Edney Hayter resigns his commission (March 14); F/O. F. J. Parker relinquishes his commission on completion of service (Nov. 28, 1934); F/O. M. G. Bircham relinquishes his commission on account of ill-health (May 8).

SPECIAL RESERVE

General Duties Branch

The following are granted commissions as Pilot Officers on probation:—J. S. Bell (April 22); C. E. Malfroy (May 8).

AUXILIARY AIR FORCE

General Duties Branch

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—P/O. H. M. Goodwin resigns his commission (May 8).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—C. Hallawell, to No. 502 (Ulster) (Bomber) Squadron, Aldergrove, Northern Ireland; for Flying duties, vice Sqn. Ldr. H. E. Walker, 29.4.35. A. D. Rogers, A.F.C., to Headquarters, Coastal Area, Lee-on-the-Solent; for Personnel Staff duties, vice Sqn. Ldr. C. E. H. C. MacPherson, 15.4.35; A. M. Wray, M.C., D.F.C., A.F.C., to No. 43 (Fighter) Squadron, Tangmere; to command vice Sqn. Ldr. F. Wright, 29.4.35.

Flight Lieutenants.—J. D. F. Bruce, to No. 22 (Bomber) Squadron, Donibristle, 26.4.35. G. R. M. Clifford, to Air Navigation School, Andover, 29.4.35. A. H. Love to No. 101 (Bomber) Squadron, Bicester, 29.4.35. H. A. L. Pattison, to No. 4 (Army Co-operation) Squadron, South Farnborough, 24.4.35. D. W. R. Ryley, to No. 33 (B) Squadron, Upper Heyford. 25.4.35.

Flying Officers.—N. H. J. Tindal, to School of Army Co-operation, Old Sarum, 18.4.35. J. G. Cardale, F. C. Daubney, N. G. Goodman, A. McIlwaine, C. C. McMullen, A. D. Messenger, G. H. O. Mills, R. Monks, Q. W. A. Ross, to Electrical and Wireless School, Cranwell, 28.4.35. H. V. Satterly, to R.A.F. Station, Biggin Hill, 30.4.35. R. C. M. Ferrers, to No. 2 (A.C.) Squadron, Manston, 29.4.35. K. J. McIntyre, to No. 13 (A.C.) Squadron, Old Sarum, 29.4.35. R. E. Weld, to No. 16 (A.C.) Squadron, Old Sarum, 29.4.35.

Acting Pilot Officers.—The undermentioned officers are posted to the Royal Air Force Depot, Uxbridge, on appointment to Short Service Commissions as Acting Pilot Officers on probation with effect from 16.4.35:—R. C. Ayling, M. R. Baillon, M. Beckett, J. L. M. Bell, H. R. A. Beresford, P. H. Bragg, L. O. Brooks, W. H. Carroll, R. Cave-Browne-Cave, G. A. L. Cheatle, M. G. W. Clifford, J. J. E. Coats, G. L. A. Cooper, R. B. Cox, A. G. F. Cuningham, C. F. Darbishire, P. J. G. Davies, G. W. P. Derbyshire, G. H. J. Feeny, D. V. W. Francis, G. H. N. Gibson, D. E. Gillam, J. Greenhalgh, J. C. Halley, D. A. Hamilton, P. M. Hamilton-Hall, R. B. Harvey, A. C. Heath, P. G. Heath, J. V. Hoggarth, G. R. Humphries, C. J. K. Hutchins, E. P. W. Hutton, E. L. Hyde, H. H. A. Ironside, A. G. T. James, H. B. Johnson, C. H. Jones, H. D. Jones, J. A. C. Karran, P. G. Keeble, R. N. Keeble, F. J. Kelly, G. A. H. Kent, L. J. Kiggell, R. H. S. King, L. A. G. S. Lewer, T. M. Lockyer, R. C. Love, F. A. Marlow, F. R. McAllister, K. M. McCrudden, A. S. McTurk, C. A. Masterman, C. G. Masters, R. A. Milward, W. E. Mulford, P. C. R. O'Hara, R. J. Ommanney, C. L. Page, R. H. Paterson, M. V. Peters-Smith, P. C. Pinkham, A. C. Rabagliati, J. Rankin, P. H. Richmond, E. G. Rogers, B. D. Sellick, J. B. W. Smith, J. G. Spencer, P. A. M. Stickney, R. D. Stubbs, G. W. C. Watson, J. L. Wells, E. L. Wurtele, A. J. Young.

Medical Branch

Flight Lieutenant.—O. S. M. Williams, to Air Armament School, Eastchurch, 25.4.35.

AN EXPERIMENTAL EXPERIENCE

Empire Air Day Preparations : A Visit to Martlesham and Felixstowe

"AND I landed on the concrete between those two buildings." It was at Martlesham last week, and a test pilot was telling his story of a parachute drop from a disintegrating aeroplane. He was telling it, under relentless pressure, for the express benefit of a visitor who could develop no enthusiasm for partial climbs and radiator suitability tests. He told his tale in roughly two dozen words and, on its completion, emphasised that it took place in the old days—ten years or so ago. Those were the days, of course, when pilots testing high-flying fighters tied a hand to the throttle lever so that the engine would shut down should they "pass out" through defective oxygen apparatus. They usually came round again at about 7,000ft. Oh, rather, oxygen gear was pretty reliable these days. It had to be. You see, fighters, the "Gauntlet," for instance, were getting to 35,000 and over. . . .

No Heroics

If anyone intending to visit the Aeroplane and Armament Experimental Establishment, Martlesham Heath, on Empire Air Day (May 25) expects to be regaled with tales of how Martlesham pilots dice with death, cheat the grim reaper, and flirt with disaster, he will come away unsatisfied. But he will meet the most modest, charming and skilful pilots in the world. He will see some wonderful new aeroplanes, and will be shown over an aerodrome equipped for the testing of new types of military and civil machines, armament and aircraft equipment.

On our visit to Martlesham the other day, the C.O., Group Capt. Maund, said that on the "big day" he hoped there would be among the wide assortment of aeroplanes at Martlesham (often over thirty different types fly during the course of a week) Scott and Black's "Comet," an Autogiro, the Northrop bomber, and the Handley Page G.P. monoplane. Of these, the last two were there during our visit. Incidentally, it seems that Martlesham's opinion of the Northrop might be summed up in the words of an officer who said that here was an example of how a very good commercial machine would make a fairly good bomber.

Full-load Tests

The Handley Page G.P. monoplane was flying with its full military load, which included a shiny, red-nosed torpedo. We saw also the Miles "Merlin," not yet with C.-P. airscrew, a Fleet Air Arm "Shark"—the collapsible dinghy of one of these sturdy torpedo bombers came adrift during a dive the other day—a production "Gauntlet," a brace of "Overstrands" (there was talk of "Pegasus X's" to be fitted to one of these), the Gloster T.S.R., a "Vincent" and a "Vildebeest," and a "Valentia." A pilot told us that this latter, which is really a modified 'Pegasus-Victoria, will do about 125 m.p.h.

A great number of the aeroplanes at Martlesham are standard Service types, which are used for testing new armament, instruments, and equipment. There is, for example, the "Vildebeest," painted night-bomber green, and used to test night-flying gear, and the "Gordon," the pilots of which try out the latest electrically heated clothing.

The armament section is busy experimenting with gun mountings which can be used on high-speed two-seaters. We flew in a "Demon" fitted with an experimental type of gun ring and, incidentally, with target-towing equipment. Although no gun was fitted to the ring, it was apparent that at speeds over about 160 m.p.h. the use of a gun would be very restricted. It is not only wind pressure that beats the gunner, but the "G" developed during rapid manœuvring. New types of machine guns are tested at Martlesham for functioning at high altitudes and are fired at night as well as by day so that the sights may be tested and the muzzle flash noted. Live bombs are dropped on the shingle at Orford Ness, a few miles away. The public will see nothing of this on May 25, although there will be exhibitions of "bombing-up" and the dropping of bombs from machines on the ground on to bags of sand beneath their wings.

Every Service landplane type is put through its tests at Martlesham and, in addition, one of every civil type must undergo tests there for its C. of A. When a military aeroplane arrives it is weighed and the C. of G. is determined. The actual flying tests include full-load, full-throttle climbs, oil-cooling tests—in which the machine climbs to a stated height, where the oil temperature is noted, and glides down until the oil cools—speed trials over a camera obscura, "stick" and "unstick" trials, taxying and braking tests, and camera gun trials. The military qualities are noted by different pilots, and tests are made to determine the steadiness of the machine as a gun platform. Terminal velocity dives are not usually commenced lower than 20,000ft., where the petrol is turned off. Instrument readings are normally recorded by the pilot on a pad strapped to his knee, but experiments are being made with dictaphones for this purpose. So far perfection has not been attained. From one and a half to three months is usually spent by a pilot in learning to synchronise flying and recording instrument readings.

At Felixstowe

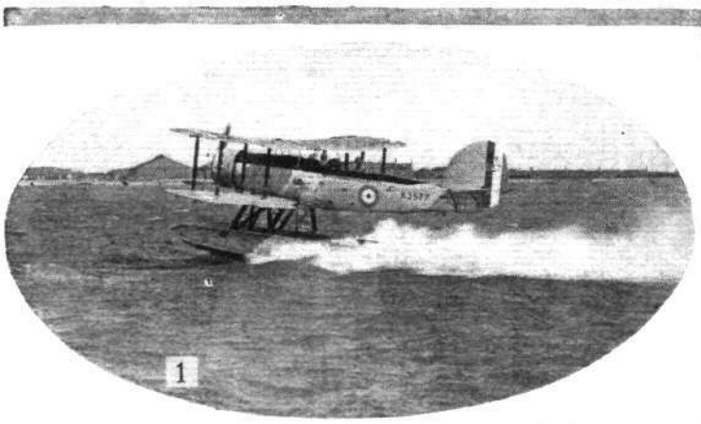
Taking leave of Martlesham, we went on to the Marine Aircraft Experimental Establishment on the Felixstowe flats overlooking Harwich harbour. Before the massive hangars was a bevy of marine aircraft sunning themselves on the concrete apron—a Saro "London," looking very sophisticated with polygonal cowlings, a "Perth" with no tail, a handsome "Scapa," a IIIF, and a "Seal" floatplane (with a "Panther VI" and the new Siddeley cowling which gives it a much cleaner look), while riding at their moorings in the choppy, grey sea were two "Southamptons" and the new Supermarine boat with two "Pegasus" engines, known at Felixstowe as the "Mark V."

Boarding an R.A.F. pinnace, spotlessly clean and handled in a masterly fashion, we went out into the harbour. The "Mark V" and the "Southamptons" had, by this time, taken off, and a "Singapore III" had come over from beyond Harwich to have a look at us. One by one the big boats alighted beside our pinnace for the benefit of photographers. The "Mark V" was particularly impressive. She was flying "light" and the two 690 h.p. "Pegasus III's" lifted her off the water after a run not many times her length. One gathered that this boat, although her all-up weight is roughly 5,000 lb. more than that of the "Scapa," has a considerably higher performance—and the "Scapa" is a 124-knotter.

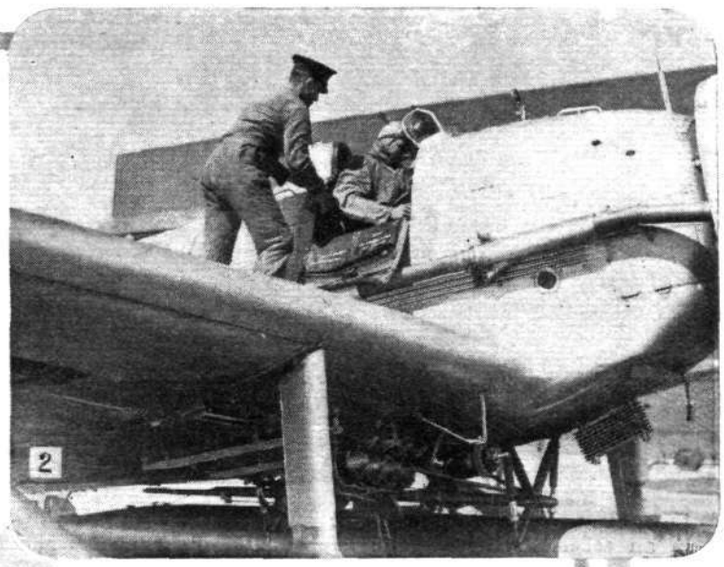
One our way shorewards we saw the "Mark V" lifted bodily out of the water by the great fifty-ton crane on the jetty and lowered on to her land chassis.

The tests made with landplanes at Martlesham are, in the main, carried out on marine aircraft at Felixstowe. Additional tests which are required are those for determining pitching and riding qualities in different seas, rough and smooth take-offs, tests in various tideways, and those to determine salt-water corrosion. The station has an up-to-date hull-pressure testing section, and its marine section handles an assortment of the British Power Boat Company's motor craft.

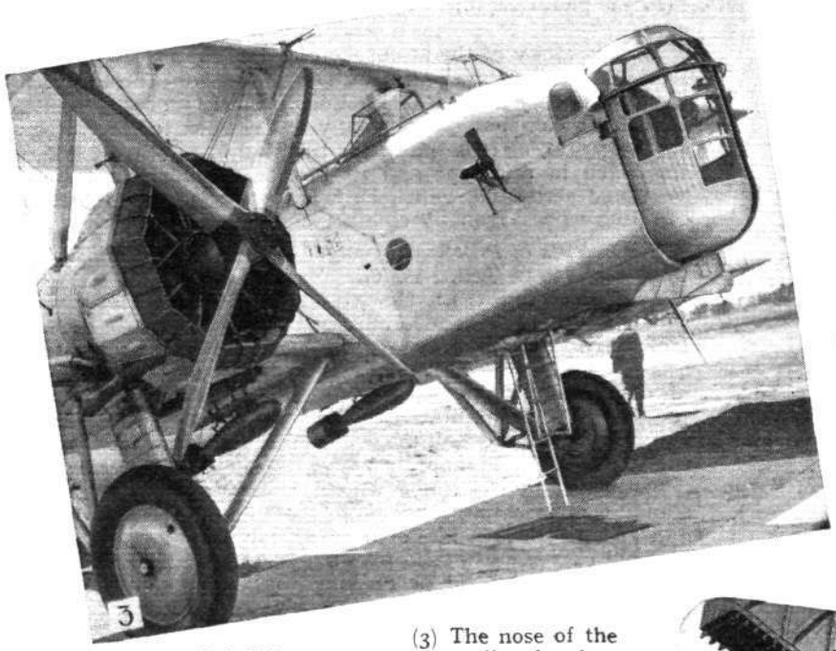
"MARTLESTOWE"

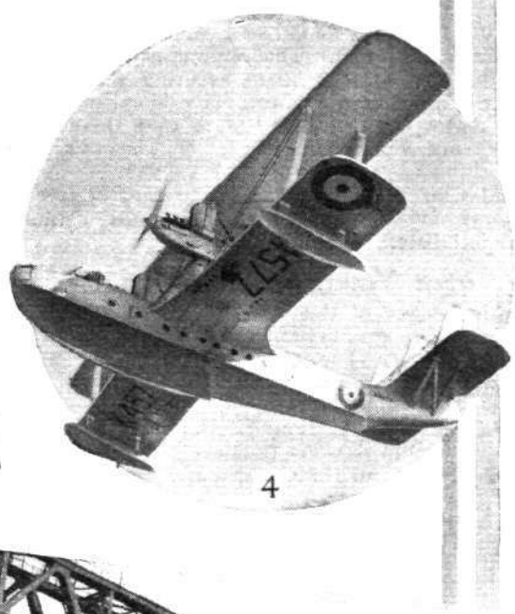


(1) A Fairey "Seal" alights across the bows of the photographic pinnace at Felixstowe.



(2) A Martlesham pilot prepares to take up the Handley Page "G.P." for full-load trials.





(3) The nose of the R.A.F.'s new 152 m.p.h. medium bomber, the "Overstrand," showing the mechanical turret.

(4) A cod's-eye view of the "Singapore III," now being issued to certain squadrons.

(5) Lowering the big new Supermarine on to its land chassis with Felixstowe's 50-ton crane.

(6) The great crane fishes the new "Pegasus"-powered Supermarine "Mark V" out of the water.

(*Flight* photographs.)

HERE AND THERE

News of the Latest Developments in the Aeronautical World

NOT SO GRIM AS IT LOOKS: The realistic aeroplane fire staged at the recent R.Ae.S. Garden Party; the "pilot," clad in an asbestos suit, is quite happy amid the flames, while two similarly attired "rescuers" are about to walk into the fire and extricate him. (*Flight* photograph.)

Dame Rumour Works Overtime

A RUMOUR and a denial of a rumour figure in this week's aeronautical news. The rumour is to the effect that the Alvis Company, of car manufacturing fame, is considering the production of aero engines. The denial of a rumour comes from Rolls-Royce, Ltd., who state that there is no truth in the news (not reported in *Flight*) that negotiations are afoot for a working agreement with the Hawker Aircraft Company; they add that their intention is to remain free to work in the closest co-operation with all aircraft manufacturers as engine specialists.

First Young Pilots' Fund Grants

The Air League of the British Empire announces that the first seventy-five grants under its Young Pilots' Fund have now been made. The potential pilots range in age from seventeen to twenty-six, and all of them will pay half the cost of their tuition, the remainder being found by the Fund.

The Prince of Wales, Lord Londonderry (Secretary of State for Air), Sir Philip Sassoon (Under-Secretary of State for Air), Lord Wakefield, Lord Iliffe, and many prominent business men have contributed to the Fund.

Hangar as Birthday Present

Lord Londonderry, who was 57 years of age last Monday, was the recipient of a unique birthday present. It was the gift of a hangar erected on his estate at Mount Stewart, Northern Ireland, from Lady Londonderry.

The Air Minister, who is a qualified pilot, owns two private aeroplanes, and the birthday hangar has been specially erected to accommodate both machines. The hangar is made of asbestos cement, and the roof framework is electrically welded steel. When the two machines are in the hangar an asbestos curtain, supplied by Bell's Asbestos Company, will be dropped between them as a precaution in the event of fire.

The hangar was designed by Mr. G. R. Falkiner Nuttall.

An Airspeed Acquisition

The Airspeed Company has acquired the rights for the Smith V.P. airscrew (described in *Flight* of May 9) in this country.

Practical Handbooks

"An Elementary Course of Aviation." By Flt. Lt. Charles W. Hewitt, R.N. (Rtd.), M.Inst.B.E., A.R.Ae.S.I. John Hamilton, 3s. 6d.

"Flying," Flt. Lt. Hewitt remarks in the preface to his book, "is not a sport, it is not even a business, it is really a new form of existence," and everyone—even those who have no intention of becoming amateur or professional pilots—should learn at least something about the way in which aircraft operate. "An Elementary Course in Aviation" covers the whole subject in detail from the ground upwards, and is designed so as to be understood by the least technical and, for that matter, the least interested.

From a study of the atmosphere and of the principle behind lighter-than-air travel, the author moves on through aerodynamic theory and control actions. He is probably right in devoting a complete chapter early in the book to the Autogiro (or Autogyro, as it is spelt), for the Man in the Street is more interested in this type and its possibilities than in the conventional aeroplane, which he has been brought up to think of rather as a personally conducted projectile.

"Elements of Practical Flying." By P. W. F. Mills. The Technical Press, Ltd. 1s. 6d.

As opposed to Flt. Lt. Hewitt, Mr. Mills deals with the whole subject in a concise and erudite manner. This little book, in fact, might more usefully be read by the novice who is already a licensed pilot or who has, at any rate, taken a certain amount of dual instruction. Although, with painstaking attention, the person who is ignorant of the simple elements of aviation will be able to follow all the arguments, there is a tendency for the author to float happily above the head of the novice.

However, for the reader who has already a general understanding of principles and, more particularly, of practical reactions, the book will be most valuable, and several aeronautical expressions—such as wing-loading and power-loading—which convey little or nothing to the average interested person, are clearly and carefully explained. Furthermore, the author brightens his narrative with little touches of gently humorous criticism. Speaking of view, for instance, he says "... some (aeroplanes have) a good view in all material directions and some a good view in no material direction whatever."

H. A. T.

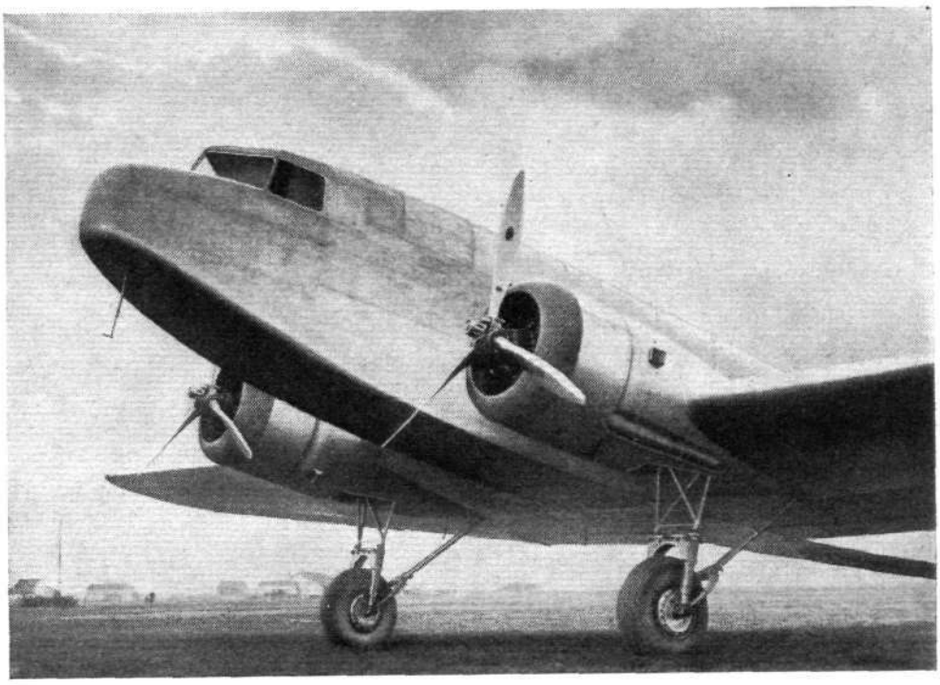
ITALY'S LATEST TRANSPORT

The Fiat G.18 : An Eighteen-Passenger Monoplane with a 185 m.p.h. Cruising Speed

ULTRA-MODERN in conception, the new Fiat G.18 monoplane is an excellent example of the highly creditable commercial machines being constructed in Italy to-day.

As regards constructional features, the wings are completely of duralumin, with three longitudinal members and, for the most part, smooth sheet duralumin covering, although the trailing edges are fabric-covered. The tips are easily detachable from the main wings. It appears that the ailerons are connected to the gear controlling the trailing-edge flaps, so that when these latter are lowered the ailerons behave in a similar manner, although retaining their differential movement. The wing is tapered both in plan form and in thickness; the centre portion is built up of steel tubing, and carries the engine mountings, retractable undercarriage and petrol tanks.

Duralumin is employed for the entire fuselage, and the skeletons of the tail members are also of this material. Except for the tail plane, which is covered with smooth metal sheet, the tail units are fabric covered. Retraction of the landing wheels is effected by an electric motor, although an emergency hand gear is provided for safety's sake. Each half of the landing gear is fitted with a fork, consisting of two compression legs, and has a compressed air brake and a medium high-pressure tyre.



Typically modern in appearance, the Fiat G.18 has some interesting constructional details. A photograph of the complete machine appeared in *Flight* of March 28.

The Engines

Power is provided by two Fiat A.59R. geared and supercharged radials giving 700 h.p. each at 2,150 r.p.m. at 6,500ft. These are actually Pratt and Whitney "Hornets" built under licence, and are fitted with N.A.C.A. cowlings, the forward portions of which are readily removable by unscrewing four bolts. The engine nacelles have fireproof bulkheads and a special type of oil cooler fitted with shutters controlled by the pilot. Hamilton three-bladed variable-pitch airscrews, and hand and electric starters are fitted as standard.

The rods and cables leading to the control surfaces pass beneath the cabin floor in easily accessible conduits. All cables are duplicated, and each movable surface has a trimming "tab."

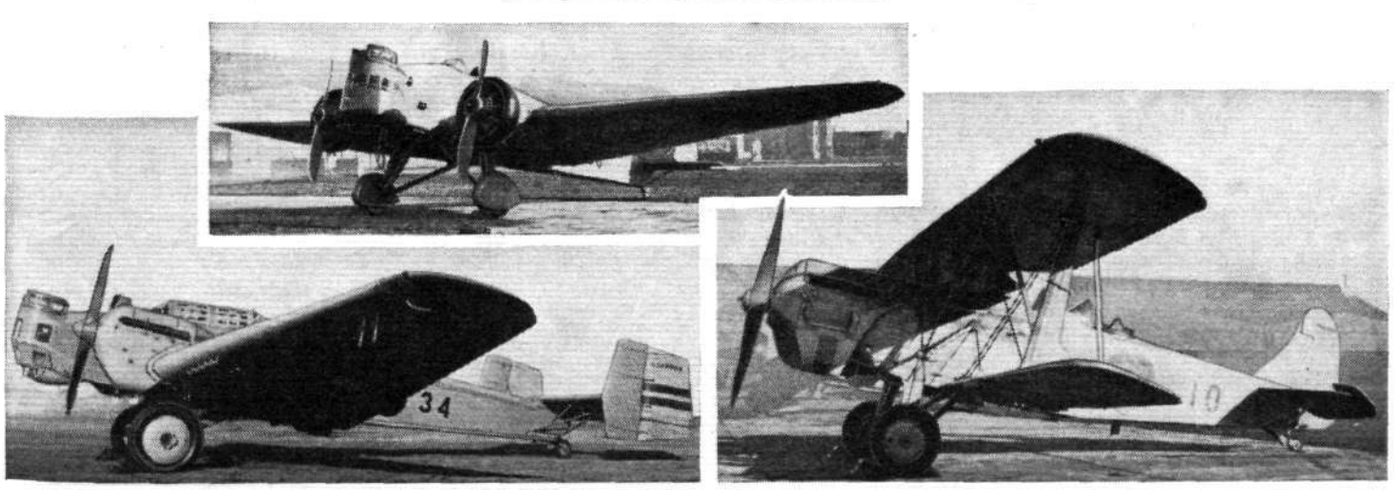
Although the G.18 has a maximum speed of 210 m.p.h., its cabin is by no means cramped. It is 6ft. high, 5ft. wide, and 29ft. 3in. long. There are eighteen seats arranged in two rows of nine, with a central gangway; the distance from the back of one seat to that of the next is 36in. Each passenger has a window of safety glass, an electric lamp and an adjustable ventilator.

Individual ventilation is secured by admitting into the cabin air which enters a vent in the nose of the fuselage, and distributing it through piping to each passenger. Heating is effected by conducting through various openings near the floor a mixture of cold and hot air which is graduated to maintain the desired temperature.

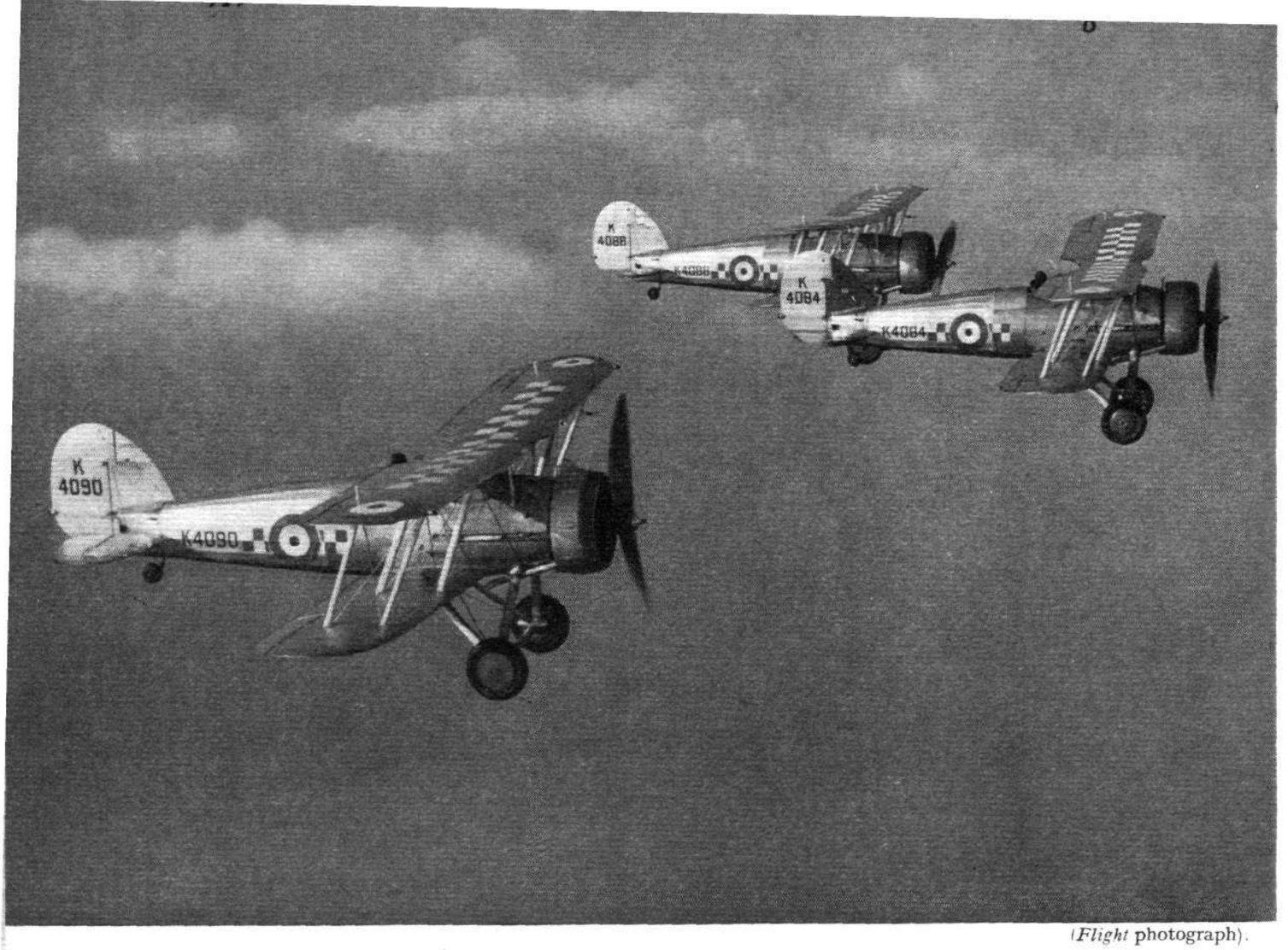
Wireless and an exceptionally complete array of navigational instruments are carried in the pilot's cabin, which is situated well forward and allows an excellent outlook.

The main data on the Fiat G.18 are as follows:—

Wing area, 947 sq. ft. (*88 m²*); weight empty, 11,794 lb. (*5 350 Kg.*); gross weight, 17,637 lb. (*8 000 Kg.*); maximum speed, 210 m.p.h. (*340 Km/hr*); cruising speed, 185 m.p.h. (*300 Km/hr*); ceiling, 21,000 ft. (*6 500 m*); ceiling on one engine 8,800 ft (*2 700 m.*); range, 500 miles (*800 Km*).



A JAPANESE BOMBING TRIO. The Mitsubishi "93" (top), has two 450 h.p. Nakajima "Jupiters," while the larger machine (left) is fitted with two Mitsubishi water-cooled engines of 700 h.p. each. A single Kawasaki B.M.W. IX, also of 700 h.p., is used in the Kawasaki biplane (right). The top speeds of the three machines are 155 m.p.h., 137 m.p.h., and 161 m.p.h. respectively.



(*Flight* photograph).

THE "GAUNTLETS" GO FORTH

FLIGHT is privileged to publish the first photograph taken of a flight of Gloster "Gauntlets" (Bristol "Mercury" engines) flying in formation. As may be seen from the chequers of blue and white on the wings and fuselages of the machines, this flight belongs to No. 19 (Fighter) Squadron, which is stationed at Duxford, in Cambridgeshire. It is, in fact, "C" Flight of that squadron. An article on No. 19 F.S. appeared in *Flight* of January 5, 1933, when the squadron was equipped with "Bulldogs." Its re-equipment with "Gauntlets" has now been all but completed. Quite a number of other fighter squadrons will also be equipped in the near future.

The "Gauntlet" is the most remarkable fighter aeroplane in service to-day. In speed, climb, and general performance it is *facile princeps*. Its top speed is 230 m.p.h. at 15,800 ft., with a stalling speed of 59. It can climb to 15,000 ft. in 6.25 minutes, and to 20,000 ft. in 9.2 minutes. Its service ceiling is 35,500 ft., which is 6,500 ft. higher than the summit of Mount Everest. The engine is a Bristol 640 h.p. air-cooled "Mercury VI S." Pilots who have flown the machine are loud in its praises. It may not have a velvet glove, but it has, in horsey language, a mouth of velvet, perfect manners, and no vices.

An interesting fact in connection with the "Gauntlet" is that it is something like 10 m.p.h. faster than ordinary performance calculations would lead one to expect. It may be remembered that a specimen was mounted in the full-scale wind tunnel at Farnborough at the recent official opening, evidently with a view to trying to discover whence came the odd ten miles. Mr. H. P. Folland, the designer of the "Gauntlet," denies that there is any mystery about it, and states definitely that he knows quite well exactly how and where he obtained the extra speed. Moreover, he does not consider that the limit has been reached in biplane performance, and is confident of the possibility of obtaining even higher speeds.

The King's Reply to the Royal Air Force's Loyal Message

The Air Ministry announces that His Majesty the King has been graciously pleased to reply to a loyal message from the Air Council on behalf of the Royal Air Force and all branches of the Air Service. His Majesty's reply is given below, and in the right hand column is the text of the message which was submitted to His Majesty by Lord Londonderry.

"IT has given me the greatest satisfaction to receive the loyal congratulations which you have so kindly conveyed to me from the Air Council and all ranks of the Royal Air Force and Branches of the Air Service on my Silver Jubilee.

"The birth of the Royal Air Force will always rank as one of the important events of my Reign. From small beginnings it has grown into an essential and successful Arm of the Defences of the Empire with a distinguished record in peace and in war. I am proud to be Chief of the Royal Air Force.

"I sincerely thank you for your good wishes for the Queen and myself, and I shall always take a close personal interest in the fortunes of my Royal Air Force.

6th May, 1935. (Signed) GEORGE R.I."

"The Air Council, on behalf of all ranks of the Royal Air Force, the Special Reserve, the Auxiliary Air Force, the Royal Air Force Reserve, and Princess Mary's Royal Air Force Nursing Service, beg to submit to Your Majesty an expression of loyal devotion and heartfelt congratulation on the completion of the 25th year of Your Majesty's glorious reign.

"The Royal Air Force and all branches of the Air Service are deeply conscious of the close personal interest which Your Majesty, Her Majesty the Queen, and the Members of the Royal Family have always shown in their welfare. This knowledge will serve in the future, as it has served in the past, as an inspiration to all ranks in any duty they may be called upon to undertake.

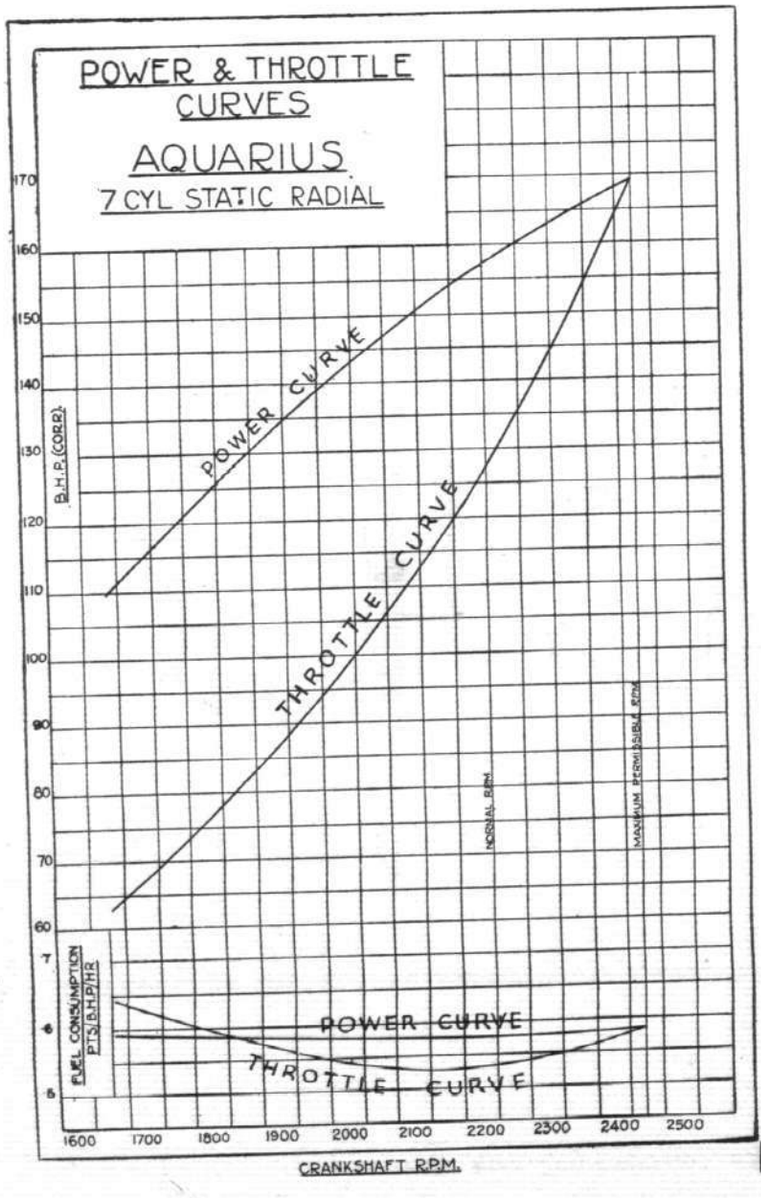
"That Your Majesty and Her Majesty the Queen may long continue to reign in health and happiness is the fervent hope and prayer of all associated with the Royal Air Force."

WOLSELEY

AQUARIUS

7 CYLINDER RADIAL ENGINE

- **Geared fan, 3.8 to 1 engine revs.**
- **Rated power (normal revs. 2,250) 155 h.p.**
- **Maximum power (2,475 r.p.m.) 170 h.p.**
- **Overall diameter 40¼ ins.**
- **Dry Weight (including starter, fuel pump and air compressor) 375 lbs.**



The engine has successfully passed a 100 HOURS TYPE TEST under Air Ministry supervision.

LONG OVERHAUL PERIOD. After 500 hours running at 9/10ths load, wear on major parts negligible.

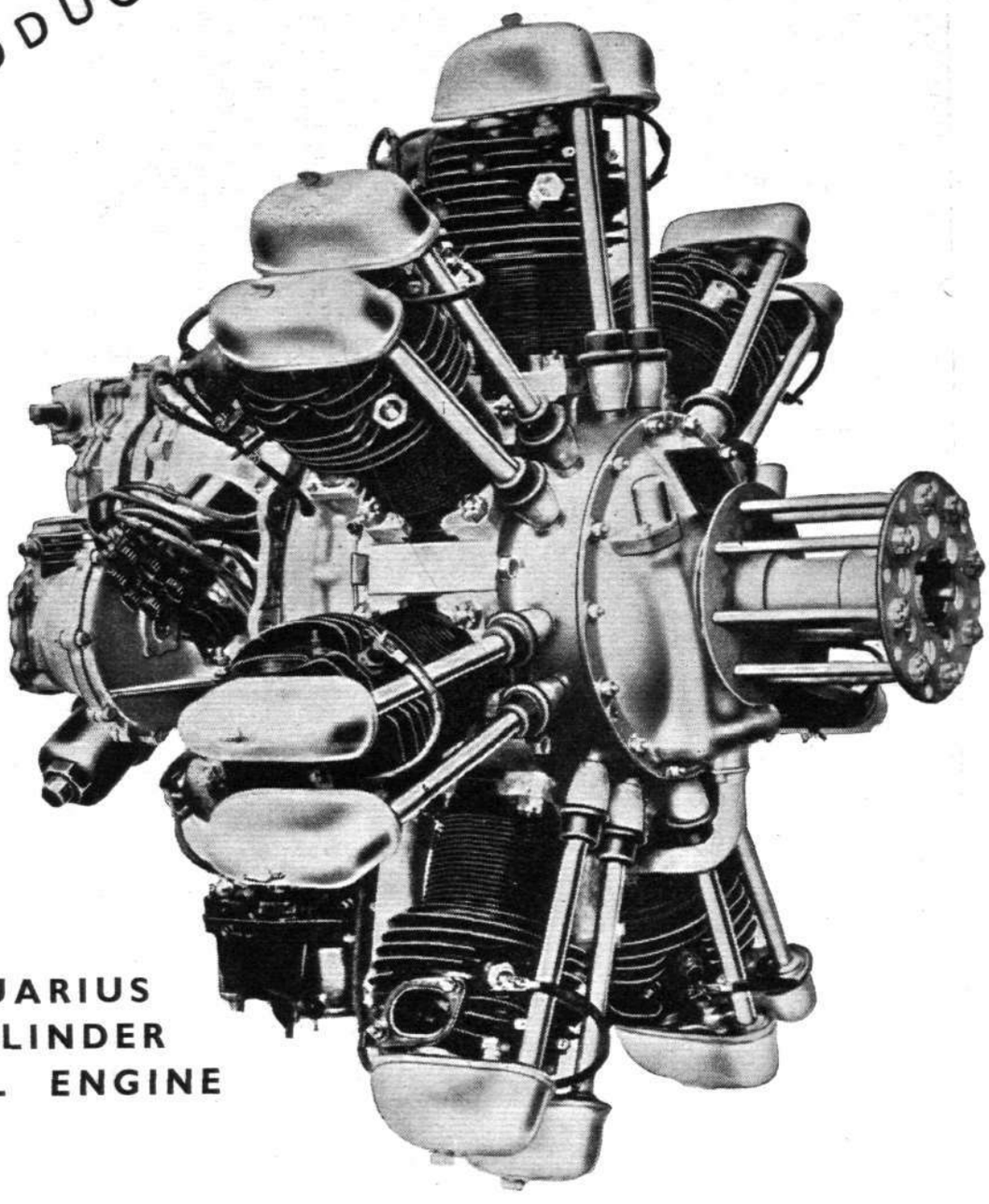
LOW FUEL CONSUMPTION of .535 pint per h.p. hour at cruising.

The GEAR DRIVEN FAN guarantees ideal mixture over the entire speed range, with consequent economy of operation.

The CARBURETTOR incorporates a mixture control, which is automatic at all altitudes, thereby relieving the pilot of responsibility of adjusting mixture strength in flight.

The OVERALL DIAMETER, designed down to the smallest possible, ensures a low drag factor.

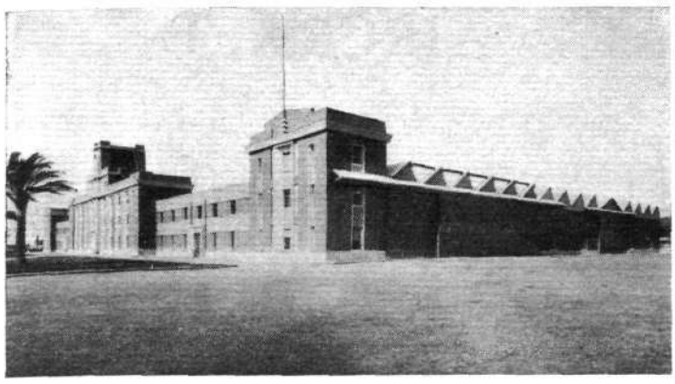
NOW IN PRODUCTION



AQUARIUS
7-CYLINDER
RADIAL ENGINE

WOLSELEY

WOLSELEY MOTORS (1927) LTD., WARD END, BIRMINGHAM. *Governing Director :* Lord Nuffield



CITY of FLIGHT

Guidonia—Italy's "Super Farnborough"

NEAR Montecelio Aerodrome, Rome, a remarkable aeronautical research centre is taking shape. It has been named Guidonia, after the brilliant Italian officer and engineer, Alessandro Guidoni, who was killed while trying out a new type of parachute in 1928. For several years, and until just before his death, he was Italian Air Attaché in London.

The new centre, which is placed close to the School of Aircraft Engineering, has been planned on a liberal scale. Among the amenities which will make Guidonia a completely independent and self-reliant town the following have already been completed or are in course of erection: Attractive villas, some of which are already inhabited; blocks of houses for workmen, a church, schoolhouse, club and entertainment rooms, cinema, market place, hotels, sports grounds, water works, electric power station, gas works, and some fine roads. The centre will also have its own political institutions.

In the building housing the Directorate of Research there are, in addition to the head offices, two separate wings, one for the photographic section, with laboratories for the study of experimental aerial cameras, films, etc., and an aircraft instrument section with special equipment for the development of blind-flying instruments.

Six Wind Tunnels

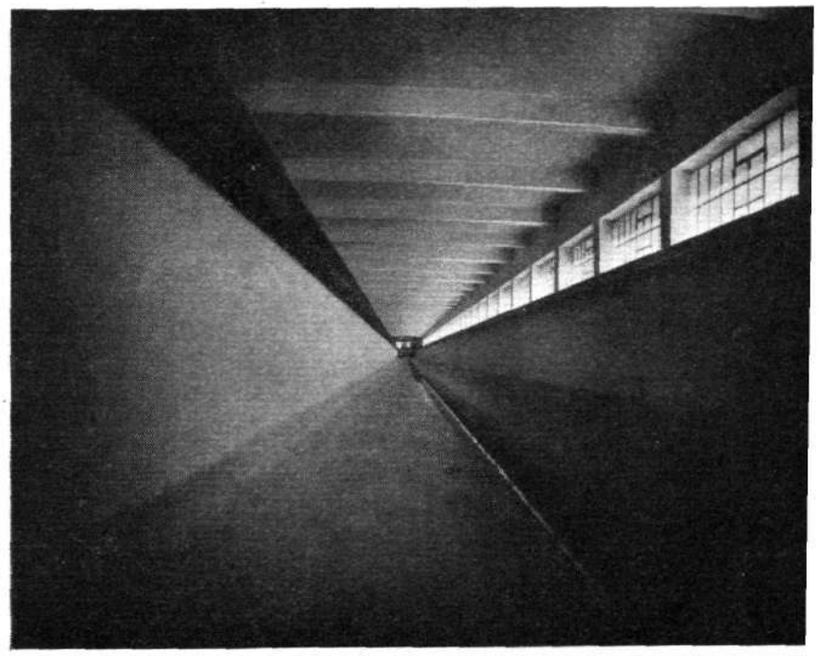
There are six wind tunnels in the aerodynamics building; four with a diameter of 6 ft. 6½ in., which can work up to a speed of 168 m.p.h.; one, 9 ft. 9 in. in diameter, with a wind speed of 225 m.p.h.; and one, of the vertical type and of similar diameter to the last, used for spinning experiments. All six tunnels are grouped around a lecture hall. There is, in addition, a large hydrodynamic tank 1,620 ft. long. Models for aerodynamic experiments are made in the workshops, as, in fact, is any precision work required by the Centre.

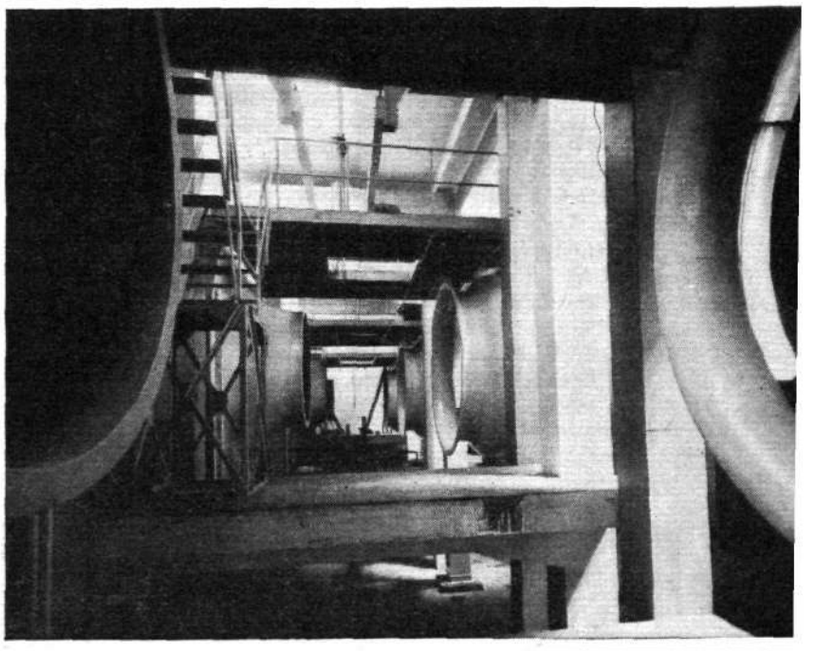
In the chemistry and physics building the chemical section is employed on the testing of fuels, lubricants and dopes, and in the study of explosives and kindred materials. The physics department is equipped for determining the properties of materials, corrosion, viscosity, and insulation against noise and heat. In a special sub-department luminous substances for night flying are studied, and there is an X-ray department for the examination of materials.

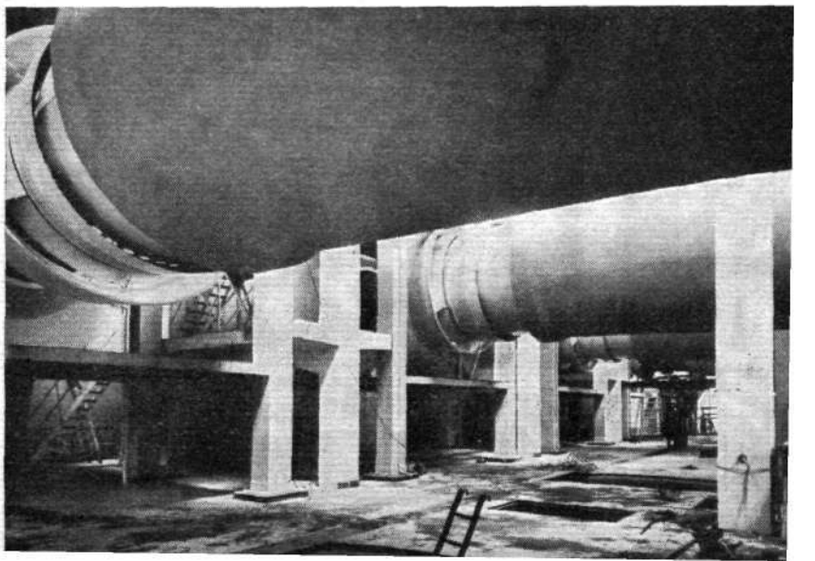
The wireless building deals with every aspect of modern aircraft wireless, and is studying the remote control of aircraft by wireless. Set apart from the other buildings, the engine section contains hydraulic and electric brakes, engine and airscrew test benches, and a very up-to-date plant for determining the properties of anti-knock fuels.

Close by the centre is the aircraft construction building. This is used as an aircraft arsenal for the static testing of machines of all sizes, and the manufacture, if necessary, of experimental aircraft or their parts.

The illustrations, reading upwards, show two views of Guidonia's wind tunnels, the hydrodynamic tank, the chemistry building and (top, left) the aircraft construction building. (Photographs by courtesy of the Italian Air Attaché.)







AMERICAN MILITARY AIRCRAFT

Recent Developments : 300 m.p.h. Fighters Close at Hand : New Flying Boats

A good field of view is essential in an observation machine. The new Douglas XO-46 ("Twin Wasp Junior") is certainly not lacking in this respect.

IN view of the somewhat uneasy international situation the United States Government is enforcing greater restriction on the issue of information applying to new military aircraft. It seems unfortunate at this time, when such strides are being made, that international politics should hamper the distribution of technical information. By the time a detailed description of the military machine is in the hands of the public the aircraft is virtually out of date.

In the matter of variety among American military types, and, possibly of importance also, machines produced by the Douglas Company take the lead. At present the bulk of this concern's constructional activities are directed towards D.C.2 commercial machines and military observation aircraft. At the time of writing there are more than £1,600,000 worth of unfilled orders on their books.

Chief of the new Douglas military designs is the XB-14, an adaptation of the D.C.2. This has a very deep fuselage belly and a wing span of 105ft. Two Pratt and Whitney two-row radials of 700 h.p. will give it a speed of approximately 225 m.p.h. Features of the military equipment include internal bomb-racks and a gun beneath the fuselage. A four-engined bomber for the U.S. Army is also "going through the shops."

It is understood that the big Douglas XP3D-1 flying boat mentioned in *Flight* of April 18 has passed all its tests. Rumours are current that the U.S. Navy intends to purchase thirty of these boats, and that a year will be required for their construction.

Yet another Douglas type of outstanding interest is a naval bomber capable of about 200 m.p.h., which is now being completed. This is supposed to be another version of the D.C.2, and will carry a torpedo inside its fuselage. A two-seater dive bomber, designated the XBD-1, is also being developed. This is a low-wing single-engined monoplane with a maximum speed of approximately 270 m.p.h.: its terminal velocity should be in the neighbourhood of 400 m.p.h. The U.S. Navy has recently taken delivery of a two-seater fighter, the XFD-1, fitted with a 700 h.p. "Twin Wasp Junior."

Heavily tapered wings feature in the design of this handy-looking Douglas XFD-1 two-seater Navy fighter. The engine is a 700 h.p. "Twin Wasp Junior."

The Douglas Company is also delivering YOA-5 long range amphibians, each reported to be fitted with two "Twin Wasp Juniors." On its trip from plant to the Army Experimental Establishment at Wright Field the prototype averaged 166 m.p.h. The design is similar to that of the familiar "Dolphin."

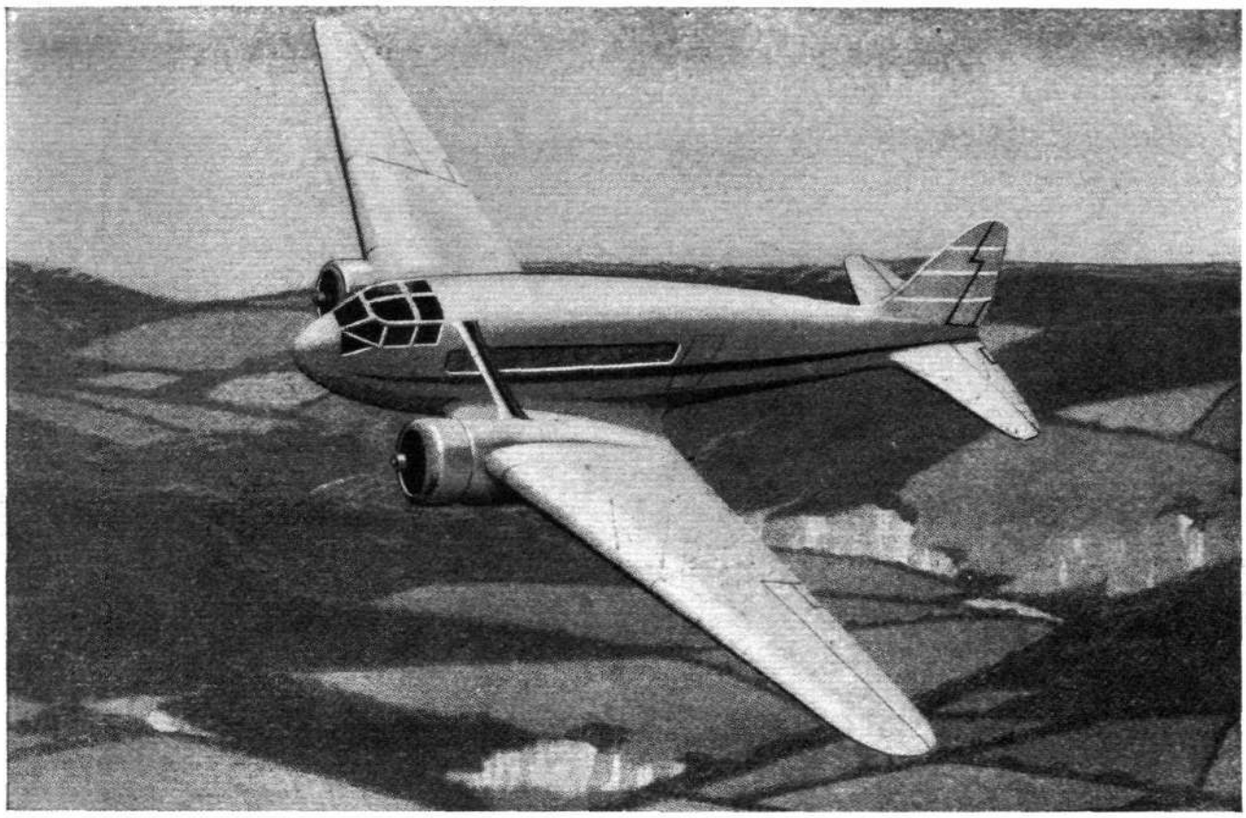
Seventy-one machines of the O-43A type, fitted with liquid-cooled Curtiss "Conquerors" giving 675 h.p. are now being assembled. The first of these "gull-winged" two-seater monoplanes, which have a maximum speed of 188 m.p.h. and climb to 10,000 ft. in 7.1 minutes, was recently delivered to the Observation Group at Brooks Field, Texas. A later Douglas design, the XO-46, has completed tests and is reported to have been ordered in numbers. Somewhat similar to the O-43A, it has a 700 h.p. "Twin Wasp Junior" engine, and its wing is braced by struts instead of by wires.

The Modified Northrop

Constant demands for increased speed have led to the modification of the Northrop XFT-1, which was briefly described in *Flight* of February 7, 1935. In its new form —it is to have a retractable undercarriage and a cockpit fairing which merges into the fin—it will be known as the XF2T-1. The modifications should bring the speed up to about 300 m.p.h. Rumour has it that a new model Attack machine is also being built at the Northrop factory.

The Lockheed Company is working on a new two-seater low-wing fighter somewhat similar to its "Altair." Some time ago this firm produced several editions of the XA-9 Attack and XT-24 Pursuit designs powered with the Curtiss "Conquerors," but nothing more has been heard of these machines. (One understands that after the prototype Lockheed fighter had passed its tests and eight similar machines had been ordered—half of them to be equipped for Attack work—the original machine broke up in the air, or, as one report put it, "was wrecked by an explosion in mid-air."—ED.) The new Lockheed model will incorporate many of the features of the two types already mentioned and will be of all-metal construction.

Largest of the orders placed by the U.S. Navy to date is one for 84 Vought SVU-1 Scout-Bombers for use on aircraft carriers. They will be powered with "Twin Wasp Junior" engines driving controllable-pitch airscrews and fitted with adjustable N.A.C.A. cowlings.



THE NEW MONOSPAR

Yet Another Type, the S.T.18, Added to General Aircraft's Range : To Cruise at 160 m.p.h. with Ten Passengers : American Engines Used

BEARING a strong family resemblance to previous Monospar monoplanes, the new S.T.18, designed and now being built by General Aircraft, Ltd., of Hanworth, will, when it takes the air in a little more than a month's time, incorporate all the latest aids to performance coupled with safety, such as retractable undercarriage, trailing-edge flaps and controllable-pitch airscrews.

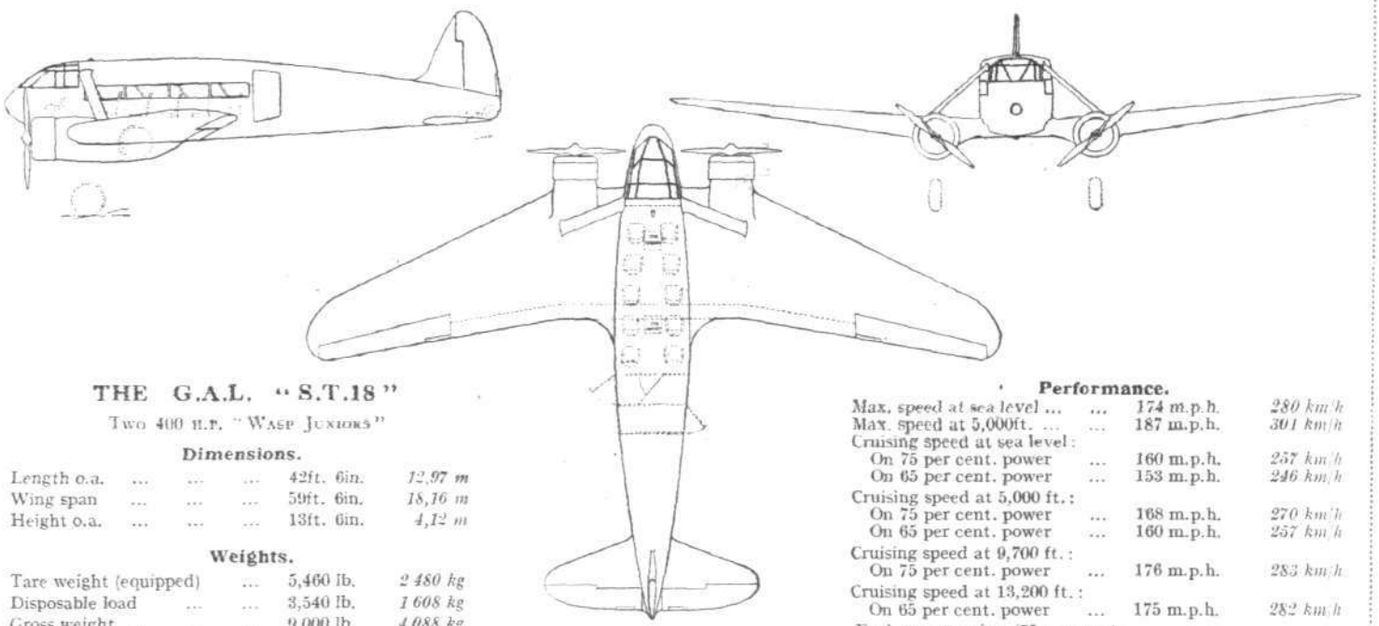
Externally the new machine will be chiefly remarkable for the considerable sweep-back of its monoplane wing. While this was doubtless desirable in order to get the centre of gravity and centre of pressure in the correct relative position, the arrangement probably has other advantages, such as the absence of a sudden and violent stall. In addition to their sweep-back, the wings are given a considerable "wash-out," i.e., the angle of incidence diminishes towards the wing tips. In a straight-wing aircraft the main advantage of this is that the centre of the wing stalls before the tips, and the machine is not so likely to go into a spin. When the wings are also swept back, the effect is likely to be that when stalling angle is approached, the nose drops gently and the machine begins to gather speed before any sudden or steep dive has developed.

From an aerodynamic point of view the S.T.18 follows in a general way the modern practice of cantilever wings and tail, retractable undercarriage, and generally clean design without avoidable excrescences. Particular attention has been given to the nose of the fuselage, not only with low drag in mind but also a good view for the pilots. The fact that the wing is placed low enables the pilots to look not only ahead and to the sides but also to the back. When the machine is standing on the ground, the crew can make sure that no other aircraft is about to land just as they are taking off.

In the main, the structural principles followed in the construction of the S.T.18 are similar to those which have characterised previous Monospar machines. This applies more particularly to the wing structure, which incorporates the now well-known Stieger-Monospar system, in which but a single main wing spar is used, located approximately one-third of the chord from the leading edge. This main spar, which is designed to be strong enough to carry the bending loads imposed by the weight of the machine, would be too flexible to resist the torsion which arises owing to movements of the centre of pressure. It is therefore reinforced by two sets of tie-rod bracing, each forming a spiral around the spar and its drag struts and running in opposite direction to the other spiral. A considerable saving in wing weight is claimed for this method of construction, but possibly even more important is the fact that when a wing tip deflects, it does so without altering its angle of incidence, and wing flutter is less likely to arise.

For the fuselage structure a change in the form of construction is to be recorded. It will be recollected that in previous Monospar machines a system of construction similar to that of the wing was adopted. A single member with spiral anti-torsion bracing formed the primary structure, and the final fuselage shape was provided by light formers and stringers, placed over the central backbone or keel member. The fuselage was, in fact, a form of chassis-and-body job. In the S.T.18 this type of fuselage construction has been abandoned for a more orthodox type, with four main longerons and diagonal strut bracing. The covering of both wing and fuselage is mainly with doped fabric.

The fuselage is composed of four distinct units: the front end, which contains the pilots' cockpit, the cabin, which is one unit, the rear fuselage portion, and a wedge-shaped structure carrying the tail wheel assembly. The cabin structure has been so arranged that it is entirely free of bulkhead bracing, and the average head room is 5ft. 9in. Seating accommodation for ten passengers will be provided, and the furnishing and interior decorations are to be



THE G.A.L. "S.T.18"

Two 400 h.p. "WASP JUNIORS"

Dimensions.

Length o.a.	42ft. 6in.	*12.97 m*
Wing span	59ft. 6in.	*18.16 m*
Height o.a.	13ft. 6in.	*4.12 m*

Weights.

Tare weight (equipped) ...	5,460 lb.	*2 480 kg*
Disposable load	3,540 lb.	*1 608 kg*
Gross weight	9,000 lb.	*4 088 kg*
Ratio gross wt./tare wt. ... = 1.65		
Ten passengers	1,650 lb.	*750 kg*
Two pilots	330 lb.	*150 kg*
Luggage and mails	367 lb.	*167 kg*
Max. fuel (200 gals.)	1,540 lb.	*700 kg*
Max. oil (16 gals.)	155 lb.	*70 kg*
Normal fuel (140 gals.)	1,077 lb.	*490 kg*
Normal oil (12 gals.)	116 lb.	*53 kg*
Wing loading	17.34 lb. sq. ft.	*(84,65 kg/m²)*
Power loading	11.26 lb.	*(5,11 kg)/hp*

Performance.

Max. speed at sea level	174 m.p.h.	*280 km/h*
Max. speed at 5,000ft.	187 m.p.h.	*301 km/h*
Cruising speed at sea level:		
On 75 per cent. power ...	160 m.p.h.	*257 km/h*
On 65 per cent. power ...	153 m.p.h.	*246 km/h*
Cruising speed at 5,000 ft.:		
On 75 per cent. power ...	168 m.p.h.	*270 km/h*
On 65 per cent. power ...	160 m.p.h.	*257 km/h*
Cruising speed at 9,700 ft.:		
On 75 per cent. power ...	176 m.p.h.	*283 km/h*
Cruising speed at 13,200 ft.:		
On 65 per cent. power ...	175 m.p.h.	*282 km/h*
Fuel consumption (75 per cent. power)	40 gals	*(182 l)/hr*
Fuel consumption (65 per cent. power)	35 gals	*(159 l)/hr*
Cruising range, 75 per cent. power:		
Normal capacity	616 miles	*(990 km)*
Max. capacity	880 miles	*(1 416 km)*
Cruising range, 65 per cent. power:		
Normal capacity	612 miles	*(985 km)*
Max. capacity	1,000 miles	*(1 608 km)*
Service ceiling	24,000 ft.	*(7 310 m)*
Service ceiling, one engine	7,000 ft.	*(2 135 m)*
Max. rate of climb	1,400 ft./min.	*(427 m/min)*
Landing speed (flaps down)	65 m.p.h.	*(105 km/h)*

carried out by Rumbolds. Heating of the cabin will be from a muff around an exhaust pipe, and while the main ventilation will be under the control of the pilot, passengers will have their individual ventilator controls. The total capacity of the passengers' cabin is 406 cu. ft. One long window will be built into each cabin wall, the only obstruction to the view being a few structural members which take up but a small part of the window space.

A very substantial bulkhead separates the pilots' cockpit from the cabin. This bulkhead is a main structure member, and to it are secured the wing roots and the two wing-bracing struts, so that all the major loads are concentrated here.

In the cockpit a very complete set of instruments will be installed, and the controls have been so arranged (the flying controls are, of course, in duplicate) that they can be reached by either pilot. This applies to engine controls and the controls for operating the wing flaps, the retractable undercarriage and the pitch of the airscrews, which, incidentally, will be Hamilton Standards.

The engines which have been selected for the S.T.18 are Pratt and Whitney "Wasp Juniors." It is understood that no suitable British engine of exactly the power and characteristics required was available. Fuel is carried in the wings, the maximum capacity being 200 gallons. At a slight extra cost a gravity tank can be provided, and this, of course, can, if desired, be used for a high-octane fuel to be used during the take-off, switching over to plain petrol when the operational height has been reached.

The retractable undercarriage is similar to those fitted on some of the smaller Monospar machines. Palmer hydraulic brakes with differential rudder bar control and parking ratchet will be fitted. The operation of the undercarriage and the wing flaps will be by electro-hydraulic means, a hand pump being provided for use in case of an electrical breakdown.

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

May 19. Deutsch de la Meurthe Cup. Aero Club de France.
May 23. Jubilee Air Ball, Air League of the British Empire, at the Dorchester Hotel, London.
May 25. Empire Air Day, Air League of the British Empire.
May 29. Household Brigade Flying Club. Night-Flying Demonstration, Heston.
May 30. Wilbur Wright Lecture, by Mr. Donald W. Douglas, Science Museum, South Kensington.
June 1. Brooklands "At Home."
June 1-15. Lisbon Aero Show.
June 7-11. Whitsun Flight through Austria, Oesterreichischer Aero Club
June 8. London Aeroplane Club. Garden Party, Hatfield.
June 8. Official opening and garden party, Witney and Oxford Aero Club.
June 15. R.A.F. Flying Club Annual Display, Hatfield.
June 15. Bristol and Wessex Aeroplane Club, S.B.A.C. Challenge Cup, Whitchurch.
June 16. Scottish Flying Club Display, Renfrew.
June 29. Royal Air Force Display, Hendon.
July 1. S.B.A.C. Display, Hendon.
July 6. Royal Air Force Fly-past before H.M. the King at Duxford.
July 7. Douze Heures D'Angers, Aero Club de France.
July 13. Opening of Leicester Municipal Airport.
July 20. Opening of Brighton, Hove and Worthing Municipal Airport, Shoreham.
July 20-21. Coupe Armand Esders, Aero Club de France.
July 28. Private Owners' Garden Party, Ratcliffe, Leicester.
Aug. 17. Round the Isle of Wight Air Race and Portsmouth Air Trophy.
Aug. 24-25. Third International Flying Meeting, Lympne.
Aug. 24-25. Cinque Ports Club. International Flying Meeting and Wakefield Cup Race.
Aug. 24-30. Raduno del Littorio, Rome. Reale Aero Club d'Italia.
Sept. 4-18. Jungfraujoch Concours, Aero Club de Suisse.
Sept. 6-7. King's Cup Air Race.
Sept. 14. Cinque Ports Club. Folkestone Aero Trophy Race.
Sept. 15. Gordon Bennett Balloon Race, Warsaw.
Oct. 12-28. International Aircraft Exhibition, Milan.

Correspondence

The Editor does not hold himself responsible for the opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

GERMANY

[3034] Your editorial "Fifth of *x*th" in the issue of May 2 raises vital questions. I read your paper naturally because I am interested in aviation—or flying, as you would have it. An aeroplane is an exceedingly interesting piece of machinery. It is also an exceedingly interesting means of transport. You will agree with that. It is, further, an interesting war machine. The war purpose is incidental. If I were to ask you as a question of general principle whether you were for war or peace you would undoubtedly reply peace, but that at present war machines were necessary. That being so, it follows that nothing should appear in a paper so important as *Flight* which might hinder any advance towards permanent peace.

Some of the statements in your editorial, therefore, can only be regarded as regrettable. You say "it would not be consistent with Britain's dignity to rely for the protection of her shores on the strength of a friend"

I had thought that the days of regarding nations as individuals with whom one was or was not friendly were over. I had thought also that the power politics of Bismark were dead.

It is particularly unfortunate that at a time when we are dealing with new and sensitive German leaders, France should be described in the terms of your editorial as a friend and Germany by inference as an enemy. J DEAVILLE.

Manchester.

[We appreciate the compliment contained in the last sentence of the first paragraph of our correspondent's letter. Most certainly *Flight* whole-heartedly desires peace. We hold, however, that unilateral disarmament of Britain, and expressed advocacy of such disarmament, does "tend to hinder any advance towards permanent peace." All Europe is in a nervous state, and the recent actions of Germany have caused general anxiety. We fail to see why the sensitiveness of the German leaders deserves more consideration than do the feelings of Britain's late allies; and we are absolutely unrepentent in regarding France as Britain's friend.—ED.]

THAT "POU" BOOK

[3035] Among your very kind references to the "Pou Club" in your issue of April 25 I see that you are puzzled by the rather complicated translation arrangements, and suggest that the Club has been rather remiss in the matter.

Have you ever tried to satisfy an author over the publication of his book in an abridged form? With your connection with literature you must know that every word of an author is a pearl of price. And have you tried to carry out arrangements of that kind with a foreign author who is flooded with correspondence from all quarters of the globe, mostly without stamps for reply? It was only a wise precaution to have alternative schemes.

In fact, the book will be published by Messrs. Sampson Low, and those who subscribe 7s. 6d. now will merely have the advantage of an earlier translation so that they can start work at once and receive the English book without further payment as soon as it is published.

I am sure that the body of early constructors will agree that these seemingly complicated arrangements are preferable to a wait which might have prolonged itself indefinitely.

London, W.1. J. A. CHAMIER.

THE MOTOR GLIDER AND THE "POU"

[3036] Having seen the arrival at the Royal Aeronautical Society's display on May 5 of Mr. Collins' glider, and the flight of the B.A.C. "Drone" with its small Douglas motor cycle engine, one could not help but be impressed with the fact that the average club and private pilot could get a great deal of fun out of these machines, but the question of hangarage presents a very big difficulty, as far as I can see at the moment. The wing span is enormous, and the cost of a hangar goes up very considerably with its width. Until one can detach the wings quickly it seems unlikely that these little machines can make much headway.

The alternative of providing tramways and pushing the machine sideways in a long hangar might be one method of tackling the problem. The very long wings would appear to be rather vulnerable on the ground, and in respects such as this the *Pou* would seem to be more suitable for the man who wants a low-priced aeroplane

There is beauty and charm about the gliders and the "Drone" which is intensely attractive, and, as far as one can see from the illustrations which have appeared, the *Pou* would probably look out of place in the air.

It would be interesting to have opinions as to which is the safer type. ERIC W. WALFORD.

Coventry.

STOKE-ON-TRENT AND THE R.A.F.

[3037] My committee desire me to ask you to make known through your paper this Club's indignation at the extraordinary action of the Stoke-on-Trent City Council regarding the proposed visit of a R.A.F. squadron to Meir aerodrome; their cavalier treatment of the matter has roused great resentment in the district.

The decision came as a most bitter and unexpected blow, since all the necessary arrangements had been practically completed by the aerodrome committee, on which we are represented. We have, as a consequence, been reluctantly compelled to withdraw from participation in the Empire Air Day arrangements made by the Air League of the British Empire for May 25. NORTH STAFFORDSHIRE AERO CLUB,

Stoke-on-Trent. Robert F. E. Parkinson,

Joint Hon. Secretary.

CONTROL SIMPLIFICATION

[3038] Regarding the various views expressed and articles published in *Flight* on the above interesting subject, it has been a matter of wonder to me why the following method of turn and bank control has not been suggested or reviewed: That is, to turn by moving the stabilising surface (or tail plane) around the longitudinal axis of the fuselage, or, in the case of a pusher arrangement, to turn the smaller of the plane. This was tried out, I believe, if my memory is correct, and described in *Flight* some years ago in respect of the Focke-Wolf pusher. In trials with hastily constructed paper gliders the method seems perfect, and I have observed the action in gliding birds.

Will someone enlighten me as to wherein lies the "snag"?

Dartford. C. E. SMITH.

LEARNED, LICENSED, LEFT

[3039] There is much written on the encouragement of civil aviation these days.

Do you not think it is time something was done to help capable and enthusiastic civil pilots to afford to maintain their flying experience? For instance, a person may have become an efficient pilot and then be obliged to let it drop owing to lack of money. Is not this bad for the country?

When a student shows ability at any of the other branches of learning he is given help by way of scholarships, etc., if unable to afford his own training; surely it is time there was some way of helping an already efficient flier not to have to throw away his experience. J. PARSONS.

Leamington Spa.

NUTS TO CRACK.—No. 5.

[3040] The solution of the above is stated to have been what the marine engineer calls "cavitation," i.e., the propeller merely "cutting a hole in the water," or, in Flt. Lt. Comper's case, in the air.

It is well known to yachtsmen that a slow-running, large diameter propeller alone is effective when the speed through the water is kept low by a strong headwind and large windage of the masts and rigging. Small high-speed propellers under these conditions are just as ineffective as was Flt. Lt. Comper's prop. under the conditions referred to in No. 5.

And yet this inefficient propeller has to drag the machine off the aerodrome, when one would expect inefficiency and cavitation to be at their worst! E. W. W.

Coventry.

Further letters appear overleaf.

Correspondence—continued

EMPIRE AIR SERVICES

[3041] It has given me great pleasure to peruse the opening article of your editorial columns in the issue of April 18. While fully agreeing with your common-sense views on the subject of accelerating the R.A.F. expansion programme, I am sure it is just as clear that our Empire air services need speeding up if they are to be useful to the average aerial traveller. In this connection I feel it might prove of interest to your readers to note the strides being made by K.L.M., who write, *inter alia*, as follows: "After the twelfth of June our service to and from India will be doubled and *considerably accelerated*. Rangoon-London will then only take 4 days, Calcutta-London 3½, and Jodhpur-London only 3 days, whereas Singapore-London will be reduced to 5½ days. The same fast travelling will be maintained for the outgoing service. The 'planes we will use are flying at 280 miles an hour [kilometres an hour?—ED.] and are perfectly soundproof."

I trust these lines will find a place in your next issue. Is it not high time our Empire Airways were rendered more speedy instead of continuing the rather old-fashioned game of the "hare and tortoise"? D. M. MEHTA.

London, W.C.1.

PRIVATE-OWNER AMPHIBIANS?

[3042] As a mere disturber of the air above club aerodromes, and not as a prospective purchaser, I hardly feel justified in asking the aircraft industry to produce a particular machine for my benefit. Yet, reading your description of the Fairchild amphibian in last week's issue, it is borne upon me yet again that there is still room for the amphibian among our various types for the private owner. I know that such a machine would be heavy, expensive to buy and to run, and that manufacturers would turn up their pampered noses, but if I were a wealthy private owner I should undoubtedly have one built. What about a seaplane club, anyway?

London, W.1. T. B. D.

BOMBE GLACÉ

"That I have read in a book," he said, "and this was told to me." (Kipling).

A RECENT cold snap decided certain heroes (who shall be nameless) to try the effects of icing-up a night bomber. Having flown blind in the clouds and snow flurries for some long time, the pilot found the machine getting more and more nose heavy, so it was decided to climb higher and have a look round. A still small voice from the front cockpit mentioned the fact that there was already four inches of snow in there, and that the windscreen was opaque. The scientific mind, however, was still not satisfied, and it was decided to climb still higher —into the father of all clouds, which reared itself head and shoulders above the rest.

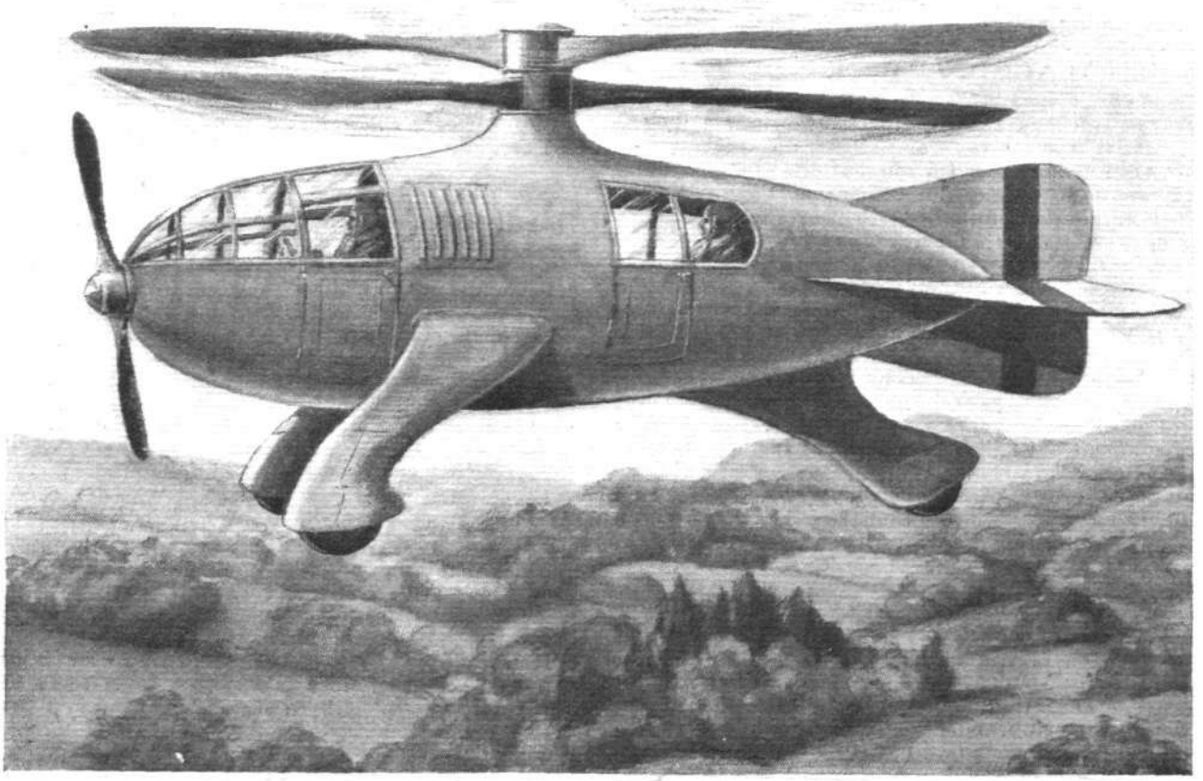
After a few minutes at 14,000ft. the air speed indicator showed only 65 m.p.h. Engines were opened up a bit, but still the dial gave only 65 m.p.h., the pressure tube being choked with ice. Then a glance at the turn indicator made the pilot pull the wheel hard over . . . and the next thing he realised was that the engines were at their maximum revs.

Instructions were given for the crew to jump; but the speed and attitude of the machine making execution of the order impossible, the pilot thought, "If they can't get out, neither can I; so let's see what can be done about it."

By this time the bomber was in a straight dive and, by hauling manfully on the control column, the pilot flattened out at 3,000ft. with the aerodrome directly underneath.

Inspection on the ground showed the rudder fins to be seven inches out of true at the top, the leading edges of the elevators and ailerons bent and curled under, and the centre section of the top wing two inches farther from the fuselage than it should have been. . . .

A little less luck, a weaker machine, and one more inexplicable crash would have kept a court of enquiry busy for weeks trying to decide the reason. J. Y.



VISION OF THE NOT-SO-DISTANT FUTURE? In *Flight* of March 21 there appeared an artist's impression, drawn from the inventor's plans, of the Asboth helicopter. Here is another sketch, made from revised designs. The engine-driven rotors for vertical lift revolve in opposite directions, thus cancelling out torque reaction. The original experimental machine has many hours of efficient flying to its credit.

PRIVATE FLYING

Fighting a Gale —on the Ground

LORD SEMPILL, RETURNING FROM AUSTRALIA, HAS AN UNENVIABLE EXPERIENCE

IN the course of my Australian and Far-Eastern flying tour I have often had recourse to the seashore as a landing-place, and in many cases there have been no alternatives. One can never be sure, however, that the chosen spot will provide a firm surface, and when I had, perforce, to come down on the beach near Roebourne, the machine became deeply embedded in the soft sand. Unfortunately, in this instance the tide was coming in, and it became necessary to move the machine farther up the beach in order to avoid the risk of its being washed away. This was quite a problem, as it was obviously impossible to move it under its own power. I decided at last that the only thing to do was to dig three tracks—two for the main undercarriage wheels and one for the tail wheel—and to run the machine on to firmer sand with the aid of the engine. As I had not provided myself with an entrenching tool I looked about for a large sea-shell, and eventually succeeded, after some very hard work, in accomplishing the necessary excavation. All this time it was raining in torrents, and I had taken off my clothes in order to keep them dry. I was working under most difficult conditions, as the high wind was lashing up the sand and *débris* which lay on the shore, but at last I got the machine to move along these tracks on to a harder surface.

Unfortunately, the gale increased in force, and, although I was clear of sea for the time being, I was by no means out of trouble. The wind by this time was blowing at an average velocity of seventy miles an hour, and even if I could have safely left the controls, it would, in the circumstances, have been impossible to have held the machine by pickets; either they would have been pulled out of the ground, or, if they had held, the wires or wing fittings must have given way. There was, for a period of something over half an hour, only one thing to do, and that was to fly the machine "on the ground" into the teeth of the storm. I had to maintain about 1,600 r.p.m. in order to keep my position, for as soon as the revolutions fell much below that figure I found that I was being forced back into the sea.

Out of Danger

AT times I began to wonder whether it would be possible to save the machine, but fortunately, after a time, the wind slackened and I was able to taxi higher up the beach to a more sheltered spot above the high-water line. The wind still continued to blow strongly, and although I was by this time very tired with my exertions, it was necessary to dig the wheels well into the sand to make the machine as secure as possible. Towards evening the gale abated, and I was glad to settle down to sleep alongside the aeroplane.

During this trying period I had seen no one, and apparently there was no habitation within fifty miles of the spot. The only witness of my predicament was a lonely kangaroo, which came down to the shore and spent five minutes looking at the machine.

In the morning it was calm, and I proceeded to try and get rid of some of the sand which had got into all parts of the structure. I counted myself fortunate in having a metal airscrew, as, had it been otherwise, it must have been completely destroyed after this experience, and further flying would have been impossible. As it was, the propeller and several other parts were badly marked by the sand. However, I was soon able to take off and made for Port Headland, where I obtained some assistance to give the machine a good clean down.

It was necessary to take the engine cowling right off, as the sand had got in everywhere. Taking off later for Broome I was met by Captain Gregory, one of the leading men in the pearl-fishing industry. He represents, among other interests, the Vacuum Oil organisation, and had arranged to refuel my machine. On the two nights I stayed at Broome my machine had to be moored out, but fortunately the weather had improved. I had hoped, with the assistance of Mr. Male, who is actively engaged in the pearling business, to see at first hand something of the methods employed. I was, however, to be disappointed, as during my stay it was impossible to launch a boat.

An Emergency Ground

MY next stop was Derby, where I intended to refuel before continuing my flight northwards on the last stage to Wyndham, from which place I had arranged to take off across the Timor Sea. I found the aerodrome at Derby was situated on the marshes some distance from the town, and, while it is quite serviceable when dry, it becomes very muddy after heavy rain or after a high tide. After refuelling at Derby I made for Drysdale River Mission, which lies at the foot of Napier Broome Bay, some 400 miles distant by the coast route. Leaving Derby one passes over country covered with bush and somewhat mountainous, but entirely uninhabited. Eventually I arrived over the Mission Station, and inspected from the air a strip of land that had been prepared when search was being made for the German flyers who were lost in that region, and also for Kingsford-Smith. No aeroplane had ever landed on this before, but, as it was obviously suitable for the purpose, and no large bushes had been allowed to grow up, I had no difficulty in making a good landing. I was met here by the Benedictine Fathers and a large number of natives, and was able to deliver news from Broome and Derby which they would not have received in the ordinary way for six months or so.

I had a long talk with the Mission Authorities, and learned a good deal of the work they are doing among the natives. In the evening there was organised in my honour a large native dance, which, although very complicated, was quite interesting. I was also introduced to two natives who had won fame as being responsible for the finding of the lost German airmen referred to above. Although at this point I was farther north than Wyndham it was necessary to proceed there to refuel before taking off across the long sea passage.

The Homeward Journey

ONE has the choice of three aerodromes at Wyndham, but all are of the mud-pan type and suffer from any excess of rain. Various people in the locality had turned out to meet me, including the interesting family of Mr. Durack, who is one of the pioneers of the Kimberly district nearby. After taking on a full load of petrol I was ready to start off for Koepang on the homeward journey.

While in Australia I had flown well over 20,000 miles, my "Puss Moth" having carried me faithfully round the entire continent. The return flight to England, covering, as it did, practically the same route as the outward journey, would prove, I am afraid, of less interest to my readers, although it provided me with many further valuable experiences.

Private Flying

FROM THE CLUBS

Events and Activity at the Clubs and Schools

ABERDEEN

The total flying time of the Aberdeen Flying School, Ltd., from April 29 to May 5, was 11 hr. 35 min., of which 6 hr. 10 min. represents dual instruction. From May 1 to May 8 flying times were: dual, 8 hr. 20 min., and solo, 2 hr. 5 min

WITNEY AND OXFORD

The club has been placed on the Air Ministry list of officially recognised blind flying schools. The rate for instruction is £2 an hour, and accommodation is provided for those wishing to stay at the aerodrome during instruction at very reasonable charges.

NEWTOWNARDS

In the four weeks following the reopening of the Ards Airport on April 1, after the completion of drainage operations, the flying school has done 67 hours work. It is satisfactory to place on record the fact that five pupils qualified for their A licences in the week ended April 28, in spite of the fact that during a third of the week there was no flying. A new traffic and school office has been equipped.

COVENTRY

During April the Coventry Aviation Group gave over 27 hr instruction, and a further 10 hr. during the first six days of this month. Miss J. Jebbett and Mr. M. E. Rustin have enrolled as flying members. Four members have been passed for solo flying during the past week.

A new hangar, to hold two machines, has been erected at Whitley Aerodrome by the members in their spare time.

LANCASHIRE

Under ideal conditions, last Saturday, the landing competitions for the Pemberton and Rodman trophies were held at Woodford. The senior trophy returned from the temporary custody of Mr. Hooson to its almost permanent residence *chez* Mr. Alan Goodfellow. The junior trophy was won by Mr. Peter Brothers, the youngest flying member, under the critical eye of his school house master. Sir Kenneth Crossley made a good second in the senior event.

Austin Hopkinson, Esq., M.P., has purchased a "Hawk," and Mr. "Johnnie" Hooson has gained a new B licence. The Misses Mellowdew and Bradbury, and Messrs. Beverley, Pinckney, Harness and Ogle have taken A licences.

LEICESTER

Twenty hours and ten minutes were flown during the week preceding Sunday, May 5. An "Eagle" and a Miles "Falcon" and "Merlin" visited the aerodrome, and a safety-first demonstration was given before a gathering of chief constables. Three club aeroplanes and an Autogiro, flown by Mr. F. B. Tomkins, of A. V. Roe and Co., participated. A message bag dropping competition was won by Mr. E. C. Kendall.

During the week ended Saturday, May 11, 26 hr. 15 min. was recorded. Mr. R. D. Bradley was the first to go solo at the new aerodrome. Six cross-country flights were made, and fifteen machines of various types visited the aerodrome. Lt. Col. A. Fawcus, Mr. R. Loewenstein, Mr. E. W. Kennard and Mr. A. E. Chambers became pilot members, the latter under the Air League's Young Pilot's Fund scheme.

NORFOLK AND NORWICH

In spite of staff holidays, a record for the year was created last week, when flying times totalled over 36 hours. A number of cross-country flights, including one to Broxbourne by Mr. Alan Colman, and joy riding on Jubilee Day contributed to a large extent towards this total. Miss W. F. Hudd flew to Nottingham and back last Friday.

On Jubilee Day the Norwich Jubilee Queen and her attendants flew in club machines, and a formation flight of privately owned aircraft flew over Acle, North Walsham, Aylsham and Reepham.

No. 207 Bomber Squadron, from Bircham Newton, was received by the Lord Mayor last Thursday, and on Saturday Jubilee Air Displays visited the aerodrome. At 8 p.m. on Wednesday, May 22, there will be a debate in the clubhouse, when the Norfolk Motor Club will move "that the motor car is still more practicable as a means of transport than the aeroplane." On Empire Air Day specially reduced rates for flying will be offered to the public.

CAMBRIDGE

Flt. Lt. Walker has joined the instructional staff. Two members, Mr. Aykroy and Mr. Jones, have made first solo flights, and five new members joined during the week.

The club recorded 27 hr. 15 min. solo and 41 hr. 30 min. dual during the past week. Ten members of the C.A.S.C. attended on Sunday, and seven of them flew. The telephone number of the aerodrome is now changed to Teversham 331.

HANWORTH

Cross-country flights have been made by members to Upavon, Clacton, Shoreham, Ford and Halton, and charter trips were made to Brough, Blackpool and the Isle of Man. The total flying time for the past fortnight amounted to 94 hr. 35 min. Mr. T. Smith has passed his A licence tests, and Cdr. Hughes-Hallett, R.N., has become a member. Numerous night flights were made over the city to view the illuminations.

BROOKLANDS

On Jubilee day over fifty privately owned aeroplanes visited the aerodrome bringing over a hundred guests. Among these machines was the "Drone," which refuelled at a total cost of 2s. 3d. New Monospars were also there.

The hours flown last week exceeded 125, and several new members joined, including Messrs. Uniacke, Adams, Hodges, McQuown, Peacock and Taylor-Young. Mr. Garland went solo, and Mr. Machin obtained his A licence.

The tarmac is being enlarged in preparation for the summer. The first of the "Tigers" for the Northampton Reserve School has been delivered, and looks very smart in the Club colours. The sales department is busy, and Mr. Firth, who has just taken his A licence, is looking forward to the delivery of his new "Tiger."

HATFIELD

The flying time at the London Aeroplane Club last week was 79 hr. 5 min. Four new members joined—Messrs. E. K. C. Burton, E. R. Dessoutter, J. J. Griffin and J. D. Malcolmson—and Messrs. F. G. Waters and C. M. Stuart completed all the tests for their A licences.

Among the many visitors to Hatfield were Mr. Thielst, the D.H. agent in Denmark, who has come to take delivery of a "Moth Major" for a Danish owner, Capt. Albin Ahrenberg, who has bought a Gipsy II "Moth" from Group Capt. Christie; and the Irak Minister in London, who came to inspect three "Tiger Moths" for the Iraq Air Force. Sir Percy Mackinnon, the chairman of Lloyds, came to inspect the works, and Capt. R. Douglas, who is in charge of the South African Associated company, will be at Hatfield for some months.

Flt. Lt. G. Brembridge and P/O. D. H. Lees have become members of the R.A.F. Flying Club.

AIR SERVICE TRAINING

During April a total of 689 hours was flown on the school aircraft. This figure is considerably lower than was anticipated, but the bad weather throughout the month proved a severe handicap to a number of *ab initio* pupils.

The total number of students undergoing different courses of instruction at the end of the month was 101. Early in the month F/O. Lord Douglas-Hamilton, a former pupil, joined the staff of the school as a flying instructor. The fleet of aircraft has been augmented by yet another Avro "Cadet."

Three pupils of the school have been successful in securing appointments during the month. Messrs. K. T. Murray and O. C. A. Hankey are joining Jersey Airways, Ltd., while Mr. R. D. Hanbury has taken a temporary appointment with P.S.I.O.W.A. during the summer months. His object is to obtain experience of operating conditions before proceeding with his training. Several ex-pupils who are anxious to extend their experience have been welcomed back.

The courses of other new arrivals show plenty of variety. Mr. A. C. Campbell-Orde, the chief test pilot of the Armstrong-Whitworth Aircraft Company, is taking a blind flying course; Mr. W. H. Sutcliffe, chief instructor to the Midland Aero Club, is taking a blind flying instructor's course; Mr. P. M. Reddy, from India, is training for his B pilot's licence; and Mr. R. Bickerton, from the College of Aeronautical Engineering, is getting practical experience in the maintenance of aircraft and engines in order to complete his ground engineer's training.

Private Flying

AUTOGIRO
The Autogiro school flew 41 hr. 55 min. last week. A new pupil is Mr. Douglas for the complete A licence course, and Mrs. James Weir and Mr. J. L. Phillips are taking refresher courses. Mr. E. D. Spratt, a B licence pilot, has made his first solo flight.

NORTHAMPTONSHIRE
Twelve hours' flying was done on Jubilee Day, and several private owners viewed the local celebrations from the air. Several members attended a very successful dinner held by the Northamptonshire Aviation Club, and Messrs. Clapham and Dwyer came along to entertain. Mr. H. Deterding and Messrs. J. and G. Linnell are becoming experts in formation flying, and usually make a tour of various aerodromes during the week-end.

CINQUE PORTS
Despite persistent winds and the fact that the Club has now only two instructors since Ken Waller's departure, no less than 86 hr. 45 min. flying was registered last week.

The Hon. P. J. M. Rous, Mr. Charles Fane, and Mr. C. T. Pearson from the Small Arms School at Hythe, have joined to take their A licences, and Mr. C. S. Sinclair, of the Royal Berkshire Regiment, is continuing the training which he started in India. Mr. R. E. Casalis de Pury and Mr. S. E. Edwards are also taking A licences.

The Club's new American bar, lounge and verandah should be completed in a few weeks.

REDHILL
The flying during the week ended May 10 at the Redhill Flying Club totalled 67 hr. 5 min. The following new members joined: Messrs. H. R. F. Burr, R. F. Holmes-Chapman, H. B. Rees. and A. M. Puckle. During Jubilee Day formation flights were made by Club machines, led by the "Fox Moth," over the local pageants at Nutfield and Horley. The Beauty Queen of Horley was also flown over the Pageant in the Autogiro.

Experiments with night flying from the aerodrome having been successfully carried out with the aid of Gooding flares, night joy rides were given on Jubilee night over some of the bonfires.

LIVERPOOL
Club aircraft have made cross-country flights to Castle Bromwich, Newmarket, Barton, Carlisle and Lympne. The Jubilee dinner and dance was well attended, and during the proceedings night flying instruction was in great demand. A cross-country competition will be held at Hooton on Saturday, May 18, at 2.30 p.m.

Flying time for the week ended May 9 was 83 hr. 30 min.

LEEMING
On Jubilee day the four Yorkshire Aviation Services' school machines went on an aerial tour of Yorkshire, visiting York, Harrogate, Ripon, and Bedale in the afternoon and, in the evening, Darlington, Northallerton, and Thirsk.

Mr. H. Waugh has passed his A licence tests, and Messrs. Woolcock, Aspidin, Wilson, and Capt. Bruce-Norton have become pupils. The flying time for the week ended May 6 was 52 hr. 15 min.

CARDIFF
H.R.H The Prince of Wales was in Cardiff last Saturday and decided to return to London by air. His Royal Highness's D.H. "Rapide," flown by Flt. Lt. E. H. Fielden, arrived at the airport during the afternoon and left with the Prince at 5.15.

The club did over two hours night flying on May 6, on which occasion several members made their first night flight. In conjunction with *The Western Mail* the club has arranged a scholarship scheme, for which entries exceed 600. Dr. W. F. Waudby-Smith has become a flying member.

YORKSHIRE
Club machines flew 60 hr. 20 min. during the week ending May 4, and 71 hr. 30 min. during the following week. This means that during April club aircraft flew 127 hr. 50 min. Eight new members were gained during April, and J. Eves, W. Cockcroft, J. E. Hall and Dr. M. I. Silverton have become flying members, while Mrs R. E. Beanlands, L. Halle, Dr. and Mrs. R H. Sunderland are now associate members. First solos have been achieved by Mr. R. E. Beanlands and Mrs. A. A. D. La Touche. Four of the sixty flying scholarships awarded by the Air League have been allotted to the club. The Aviation Group Scheme grows more popular, and of its forty-three registered members twenty-two are flying.

Two More International Rallies

A number of attractive prizes are offered in connection with two International Rallies which are being organised by the Reale Aero Club d'Italia.

The first, the "Raduno Sahariano," which is being organised through the Aero Club della Tripolitania, and which is open to aeroplanes and amphibians of the 1st, 2nd, and 3rd categories, will be held between May 28 and 31. The second, the "Raduno del Littorio," will be held between August 24 and 30 and is confined to touring types.

Details and pamphlets can be obtained from the Royal Aero Club, 119, Piccadilly, London, W.1.

Studying the Private Owner in America

Three new types have been ordered by the U.S. Bureau of Air Commerce in their attempt to discover the ideal machine for the private owner.

One is a direct-drive Autogiro capable of being driven along the road with its blades folded. Its 85 h.p. pusher engine is behind the side-by-side coupé. The new "jump-off" developments may be incorporated in this machine, which is being supplied by the Autogiro Co. of America.

The second type is a normal one, to be fitted with a modified car engine and to be built by the Fahlin Manufacturing Co. This is particularly interesting in that developments along the same lines are being progressed by Sir John Carden, whose special engine will eventually be fitted in Mr. Appleby's *Pou*, which is under construction at Heston.

The third type is being constructed by the Kreidner-Reisner Aircraft Co. for experiments with rudderless control and with a new type of aileron. The machine was originally designed by Mr. Fred Weick, of the N.A.C.A., and the whole idea is to reduce the control complications to a minimum so that the owner may have nothing new to learn. The undercarriage is to be designed so that landings at all speeds—and even cross-wind landings—can be made with safety. With the new type of "middle-wing" ailerons it is hoped to achieve the correct relationship between bank and turn without the use of a rudder, and special leading edge flaps should make the approach towards restricted areas a very simple matter. The flap control is to be interconnected with the throttle so that this one lever will entirely control the angle of the flight path.

In Memory of Mme. Boucher

On August 31 the Aero Club of France is organising a competition for the "Coupe Féminine Hélène Boucher" in memory of the famous aviatrix. The event will be a timed race between Paris and Cannes, and both pilot and passenger must be of the female sex. Buc aerodrome is the starting point. The control at Cannes will be closed for each contestant five hours after her departure from Paris Further particulars can be obtained from the Aero Club of France, at 6, Rue de Galilée, Paris, and the French authorities would appreciate some British entries.

For the Coupe Deutsch

This year's Coupe Deutsch de la Meurthe at Etampes has not attracted any British entrants, but a number of flying enthusiasts from this country will be going to Etampes next Saturday to be present at the race on the following day. Air France, working in co-operation with the Aero Club de France and, through the latter, with our own Royal Aero Club, is providing a special service to Etampes, which is forty miles south of Paris, leaving Croydon at 6.30 a.m., for a return fare of £8 6s. The race is flown on a closed circuit of 1,500 miles and has all the spectacular advantages of one in which the machines pass overhead frequently.

Private owners piloting their own machines are requested to alight at Orly not later than 8 a.m. in order to obtain transport to Etampes, where landings are strictly forbidden.

A Week-end in Holland

The West Brabantsche Aero Club of Breda, Holland, has sent, through the Royal Aero Club, an invitation to British private owners to participate in their meeting at the Military Aerodrome at Gilze-Rijen near Breda, on Saturday, June 1.

The Holland-England Cup will be presented to the competitor with the smallest quotient $\frac{ST}{D}$ — where S = number of minutes after the arrival time (2.30 p.m.), T = duration flight in minutes, and D = distance covered in kilometres. Pilots must produce a certificate from the starting aerodrome with time of departure. The time of arrival is fixed at 14.30 hours, and machines must pass over a white line at a height not greater than 200 metres at Gilze-Rijen.

Pilots and passengers will be the guests of the West Brabantsche Aero Club until Sunday.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

THE WEEK AT CROYDON

Back to Normal : Jubilee Night Flights : The Official Summer : The Guernsey Service : A Tarmac Pinnace

BUSINESS has been brisk again on the air routes after the Jubilee lull. There was, of course, an inward rush just before the beginning of the celebrations, then a pause, followed by an outward rush, and now we are back to normal. Within the last ten days there have been four thousand passengers through Croydon—which thus lives up to its title of *the* airport of London.

Recently there has been nearly as much night as day flying. On every night during Jubilee Week Imperial Airways had a "Heracles" over London, and, on two occasions at least, a "Scylla" as well. Olley Air Service has worked twenty-four hours a day with special charters by day to the races and Jubilee flights by night. One night last week Olleys had to charter two Provincial Airways' machines to cope with the rush. Inner Circle Air Lines has carried about five hundred Jubilee night sightseers, and on one evening alone Surrey Flying Services took about one hundred and fifty people over London. Judging from the congestion in London and the confusion of ground communications, the only comfortable and dignified way to see the illuminations has been from the air.

According to the Air Ministry it is (officially) comfortably warm from May 1 onwards in the Croydon Airport offices. The steam heating was turned off on that date, and the pipes merely make gurgling noises which form an apt accompaniment to the coughs and sneezes of the inmates. To insist on treating a big civil airport like a Government office is nonsense. In some cases work starts at 5.30 a.m. (*not* 10 a.m.) and does not finish at 5.30 p.m., but well after midnight. In consequence of this insane regulation tenants, who pay for adequate heating, have to provide their own by means of electric stoves. Civil servants may be able to keep warm in bitter weather by thinking of their pensions, but commercial people have no pensions to think about.

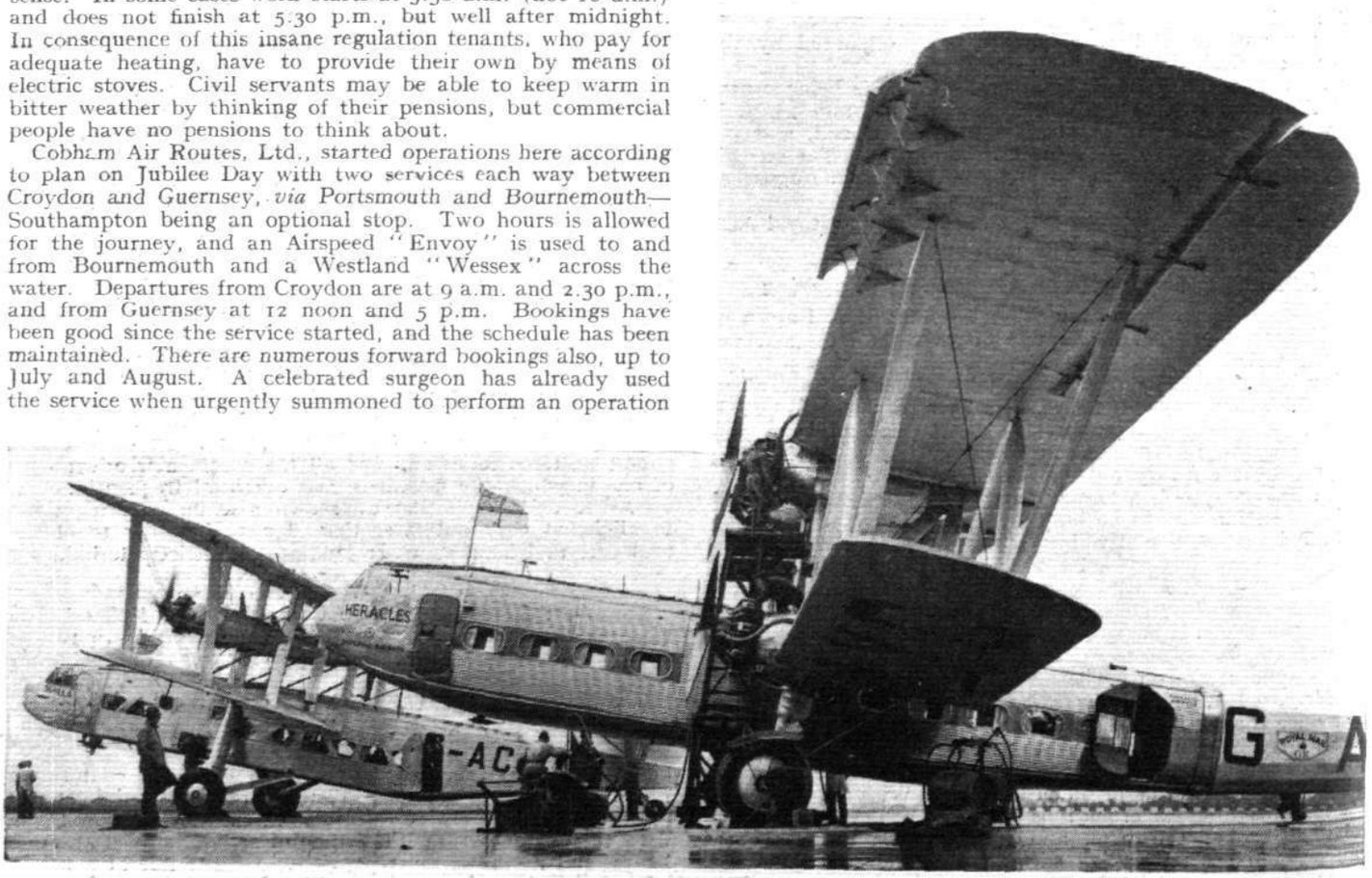
Cobham Air Routes, Ltd., started operations here according to plan on Jubilee Day with two services each way between Croydon and Guernsey, *via* Portsmouth and Bournemouth—Southampton being an optional stop. Two hours is allowed for the journey, and an Airspeed "Envoy" is used to and from Bournemouth and a Westland "Wessex" across the water. Departures from Croydon are at 9 a.m. and 2.30 p.m., and from Guernsey at 12 noon and 5 p.m. Bookings have been good since the service started, and the schedule has been maintained. There are numerous forward bookings also, up to July and August. A celebrated surgeon has already used the service when urgently summoned to perform an operation on the Bailiff of Guernsey, a most important local official. Sir Alan Cobham is confident of success for the new venture.

On Wednesday, May 8, Sir Macpherson and Lady Robertson travelled by K.L.M. to Holland, where, it is understood, they are being entertained.

It is noticed that on some of the latest Fokker types there are compartments in the wing on each side of the fuselage for luggage and freight. This necessitates the use of tall ladders and loading or unloading is less easy and not so quick as in the case of normal freight compartments. In Amsterdam, by the way, they use luggage trucks not unlike our tradesmen's cycle delivery outfits. This is a step in the right direction, though it is high time that Croydon was equipped with electrically propelled trucks. When several big machines arrive at once nearly a hundred people's luggage must be dealt with at the same time.

The Imperial Airways' gangway for passengers becomes daily more and more efficient. It is now fitted with wheels all round, and can be placed in position with a tractor. The next step will probably be to fit the gangway with its own power so that it can cruise about the tarmac like a pinnace.

On board an aeroplane recently arriving from foreign parts the following names appeared: Capeina Arnoldi, Gobius Zanthazomi, and Fundulus Bwattalus. They were not foreign delegates to a conference—merely tropical fish. A. VIATOR.



REFUELLING : An impressive picture of the two largest types in European passenger service—the Handley-Page "Heracles" and the Short "Scylla"—on the tarmac at Croydon.

PLANNING FOR THE FUTURE

Lord Londonderry's Reply to the Aerodrome Owners' Association

LAST month—on April 11—Lord Londonderry, Secretary of State for Air, received a deputation from the Municipal Section of the Aerodrome Owners' Association regarding the necessity for a national plan of air routes and aerodromes in this country, and has now communicated his views and decisions to the secretary of the association.

During the interview the delegation asked that the Air Ministry should (1) lay down what the main air routes within the United Kingdom should be; (2) designate where the main termini and junctions on those air routes should be; (3) take practical measures to make possible regular air services over those routes; and (4) advise all centres, whether on the main air routes or not, as to what plans they should make in the matter of aerodrome equipment and size.

Lord Londonderry, in his reply, intimated that the Aerodromes Advisory Board had contemplated undertaking such a national survey, but, certain difficulties having arisen, the Air Ministry have now made arrangements for carrying out the survey themselves and the preparations for doing so are now well advanced.

The information gained on the survey should, the official communication adds, give an indication of the routes on which regular air services can be operated with prospects of success. With the provision of recommended aerodromes and ground facilities there will be no operational obstacle to the establishment, by operating companies, of regular services on these routes.

"The Airport Owners' Association," the reply continues, "will, of course, recognise that the preparation of a full and detailed report, involving a survey of the whole country, must necessarily occupy some time, but there is no reason why municipal authorities at populous centres should not meanwhile take steps to safeguard their future air connections by the reservation or acquisition of suitable sites before they become impossible or too costly to acquire. At centres where the traffic proves to be very heavy more than one aerodrome may be required, but the first essential is to select and protect at least one site without delay.

"As regards Item 4 in the delegation's statement, one of the first steps to be taken in the course of the survey will be the issue, for the guidance of local authorities, of a description of the dimensions and safety requirements of aerodromes in this country. The dimensions of aerodromes will be more or less uniform since it must be envisaged that airports will be used both by night and by day as well as in all conditions of visibility if the regularity of air services is to be assured. The equipment required will vary with the class of aerodrome. The class of aerodrome recommended for localities of importance will be defined on the basis of essential equipment.

"Although the Air Ministry are *primarily* concerned with the safety aspect of operation, there are other factors to be considered in the choice of a suitable aerodrome site, *e.g.*, questions of town planning, local road and rail communications. These and like matters can, it is suggested, most suitably be considered by bodies who have the best knowledge of local conditions."

Registrations in Europe

On March 25 this year there were, according to Air Ministry statistics, no fewer than twenty-eight British machines registered by Continental air transport companies for use on internal and external air lines. Since that time five, at the most, have either been sold or taken out of service and three more have been purchased.

At the same moment there were ten American types registered, but this figure does not include the Douglas machines delivered to K.L.M., O.L. (Austria), Swissair, D.L.H., A.L.I. (Italy), or L.A.P.E. (Spain), or, curiously enough, the Boeings operated by D.L.H.

Continental Airways Regulations

The details of the new Heston communication area given in *Flight* of April 11 and the map given in the following issue gave also, by inference, the limits of the new Continental Airway Area. These have now been confirmed in "Notice to Airmen," No. 45. It will be remembered that lines joining Dieppe, Newhaven, Dorking, Kingston, Westminster (following the river), Stapleford, Clacton, North Hinder Light Vessel, Ostend and Dieppe enclosed this area, which, of course, is controlled by Croydon.

For conditions of bad visibility (less than 1,000 yd. of horizontal visibility and 1,000 ft. of vertical visibility) the Croydon controlled zone is roughly enclosed by lines following the Thames between Kingston and Erith and joining Penshurst, Merle, Redhill, Buckland and Kingston. There are six recognised channels for good visibility.

Internal air line machines and others leaving for, or arriving from, abroad must, while in this area, report to Croydon, as well as those leaving Heston or Stapleford on services traversing the Croydon area. It is always amusing to remember that, though wedded to a complicated and mediæval system of weights and measures in our ordinary life, only metric units are used for reports. The unfortunate pilot reads his instruments in feet and miles and then, with mental contortions, transforms these into metres and kilometres, while, perhaps, engrossed in some difficult blind flying.

Aircraft without radio must not fly in cloud within the area save in emergency and then only below 2,000 ft. A special concession is allowed to the Gravesend school. Incidentally, the need for a full-time radio operator becomes more and more obvious.

For the benefit of pilots without radio, panels giving an indication of QBI conditions will be displayed at Heston, Manston, Lympne and Littlestone aerodromes and at Dungeness lighthouse. Those at Manston and Lympne will be illuminated when necessary. Panels will shortly be available at Redhill, Gatwick, Penshurst and Gravesend.

Ceylon's Aerodrome

After a long delay, work on Ceylon's aerodrome near Ratmalana has begun. For the present only hangar accommodation will be provided. Our aerodrome preparation experts will be interested to hear that elephants are proving very useful for uprooting trees and bushes!

A South African Opening

According to a report from Cape Town, South African Airways will shortly call for tenders for four multi-engined machines for their operations. At present the comparable type in use is the Junker Ju.52, three of which are in service and a fourth on order from Germany. There are several projected services on which a new fleet might be used.

At Sywell

Midland Airways, Ltd., have made a number of charter flights recently, and next Saturday Mr. Leo Crilly will entertain the Mayors of various Boroughs round Northampton when his air line between Leicester and Norwich is connected with Northampton.

Bringing in Business

The Commercial Aviation Committee, in an endeavour to encourage air-mindedness amongst senior members of the staffs of manufacturing firms and leading business houses, are suggesting that flights round London or other districts, might be arranged for them. If such flights became at least annual events they would give an impetus to the development of civil aviation by enabling large numbers of people who have never been in the air, and all who have not hitherto been inclined to take the initial step, to realise the simplicity and comfort of air travel.

The importance, however, of such initial flights being made in the most silent and comfortable aircraft is appreciated. The Committee has been in touch with a number of operating companies, and the following have so far expressed their interest in the scheme and intimated their willingness to co-operate in demonstrating the advantages of air travel: Imperial Airways, Ltd.; Airwork, Ltd.; Norman Edgar Western Airways, Ltd.; Provincial Airways, Ltd.; Olley Air Service, Ltd.; Crilly Airways, Ltd.; Highland Airways, Ltd.; Portsmouth, Southsea and Isle of Wight Aviation, Ltd.; Hillman's Airways, Ltd.; North-Eastern Airways, Ltd.; and Railway Air Services, Ltd.

The three organisations represented on the Committee—namely, the London Chamber of Commerce, the Association of British Chambers of Commerce, and the Federation of British Industries—are bringing the proposal to the notice of their members.

Commercial Aviation

Mails to Australasia and Africa

Since May 12 the latest time for posting air mail for Australia and New Zealand has been 4.0 a.m. on Sunday at the head office. To-day the posting time for the mid-week service to South Africa will be altered to 4.0 a.m. on Thursday.

Douglas Machines for K.N.I.L.M.

Three Douglas D.C.2s have been or are shortly to be ordered by the Royal Netherlands Indies Airways, which, incidentally, has shown a marked all-round increase in traffic during the past year. The present fleet consists of Fokker F.7b and F.12 machines.

The Aerotransport F.22

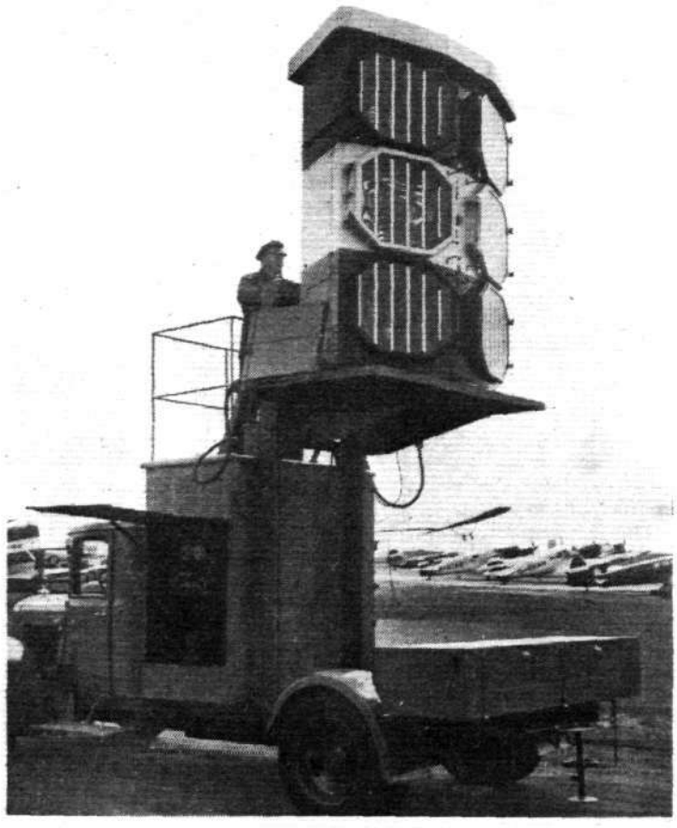
A sentence in a paragraph in *Flight* of May 2, dealing with A.B. Aerotransport's F.22 *Lappland*, may lead the casual reader to suppose that this machine is itself fitted with Gnome Rhône engines. Actually these are Pratt and Whitney "Wasps."

The Jubilee at Heston

The Jubilee week-end was almost monopolised at Heston by the air-taxi firms. Their standing equipment of aircraft was booked up weeks ahead, and they hired supplementary machines from sales firms and manufacturers. Most of this work was for the Press, but a number of passengers were taken for night flights over London to see the floodlighting.

The ban on flying over central London was little hindrance, for a good view could be obtained from outside the boundaries of the prohibited area, and immediately after midnight on Monday aeroplanes made the best of their restored freedom. Over twenty flights were made from Heston on that night alone. Birkett Air Service, as already recorded, had eight machines working and made eighteen flights on Monday, mainly on the distribution of Press pictures.

Air Commerce, Ltd., is purchasing a second Monospar, fitted with "Gipsy Major" engines, wireless, Sperry blind-flying instruments, and a sliding window for photographers in the forward part of the cabin. Among the many companies making Jubilee flights, this one had five aeroplanes out on the Monday.



AT TEMPELHOF: This self-contained mobile floodlight in use at Berlin's airport has several interesting features and illuminates an area of 1,000 sq. metres through an angle of 80 degrees.

English "Radio Compass" for France

The first Standard R.C.5 Automatic Direction Finder, or "radio compass," has been acquired by the French Air Ministry.

Airwork Service at Hanworth

Airwork, Ltd., has taken over the management of the workshops at Hanworth Aerodrome, with effect from the beginning of May. Complete overhaul, repair and inspection facilities are available.

To South America

Last week the converted four-engined Farman 221, named *Centaure*, took off from Le Bourget for Dakar with the South American mails at an all-up weight of fifteen tons. This machine, with the "Comet," is being used in a series of experimental flights designed to shorten the time of the regular mail service.

A Tata Extension

According to the *Daily Telegraph* a coast air mail line from Bombay to Trivandrum is shortly to be opened. Trivandrum, of course, is the capital of the State of Travancore, which has no direct communication with Bombay.

Presumably this service will be operated by Tatas, who expect to start a Madras-Colombo service just as soon as the Ratmalana aerodrome is ready. The company, incidentally, has two Miles "Merlins" on order, and these machines should hasten the present Karachi-Bombay-Madras mail service in no small measure.

In the Ditch

After a wonderful record with his Paris newspaper service, Mr. Pugh found it necessary to sit down in the Channel with his Spartan "Cruiser" while returning empty last Saturday morning. He and his wireless operator were rescued by a French trawler within three minutes, but the machine sank later.

The petrol feed trouble, which caused all three engines to fade out one after another, remains, and is likely to remain, a mystery. Such a failure could be the result of a number of unlikely occurrences, and is the sort of thing which might never happen again. There are actually two tanks in the Spartan, with a collector in the circuit.

In Ireland

Aviation has come before the Parliament of the Irish Free State several times recently. During a discussion on the Post Office Vote the Minister for Posts and Telegraphs (Mr. Gerald Boland) stated that correspondence for conveyance by air services in other countries was increasing steadily. Last year the number of such items posted in the Free State was 68,900, or 11,500 more than in the previous year. Speaking of the adverse criticism regarding air mail charges, the Minister explained that his Department only charged what it had to pay away to other administrations, and made no profit on air mail items. Mr. O. Grattan Esmonde, T.D., the only member of the Dail who owns an aeroplane, has tabled the following motion for discussion in the near future: "That the Dail is of opinion that the Government should take immediate steps to establish a national air transport service."

The Franco-Italian Pact

Although primarily, one supposes, a preliminary to the negotiations for a bilateral aerial pact, the Franco-Italian convention, which was signed on Monday, deals almost entirely with air line arrangements.

No details were given in the official statement, which suggests that the convention is concerned with the service which is shortly to be opened between Rome and Paris, with the projected service between Tunis and Tripoli, and with the arrangement of Southern European and Eastern lines. The Rome-Paris service will bring London within five hours of Italy; the present Imperial service operates only twice weekly. There is likely, also, to be considerable technical co-operation.

So much for the fruits of the visit of General Denain, the French Air Minister, to Italy, and of his conversations with Signor Mussolini. Among the many people present in the Palazzo Venezia was M. Mermoz, the South Atlantic pilot, who had a long conversation with the Duce.

MODELS

British Competitors at a French Meeting : A Miniature "Automatic Pilot"

BRITISH COMPETITORS IN FRANCE

IN the recent international models contest held near Paris, the British team gained three awards; a French contestant, M. Dubois, once more carried off the chief award, the cup.

Weather conditions were unfavourable, but M. Dubois put up 75 sec. with his power model, and his sailplane was timed at 4 min. 20 sec. On another occasion the same sailplane, or *planeur*, as the French call this type of craft, disappeared altogether from view, and it is very likely that, judging from the distance at which it was afterwards found, it had put up an even longer performance.

There were no fewer than forty-seven gliders, most of which were in excellent trim and generally very intelligently handled. The popular method of launching these craft was by a type of catapult which shot them up to sometimes fifty feet, thus gaining an invaluable amount of preliminary height.

An English competitor, Mr. Ross, was a few seconds behind the cup winner, and another, Mr. Liggitt, was nearly level with Mr. Ross. Mr. Liggitt gained two awards, one for performance and the other for design.

AN "AUTOMATIC PILOT"

AN interesting little "gadget" is an automatic stabiliser evolved by an enthusiast in British North Borneo, and used, he says, with great success on a Frog "Puss Moth." Space demands that we keep to principles rather than details, but the system is simple and lends itself to variation.

Briefly, he has a "joy-stick" protruding above the fuselage and surmounted by a small paper disc placed at right-angles to the slipstream. Below the fulcrum of the joystick are attached two cotton control "wires," which run back to cranks on the elevators as in a real machine. The elevators are returned to neutral by two thin pieces of elastic attached to cranks on their undersides and running forward to anchorages on the fuselage.

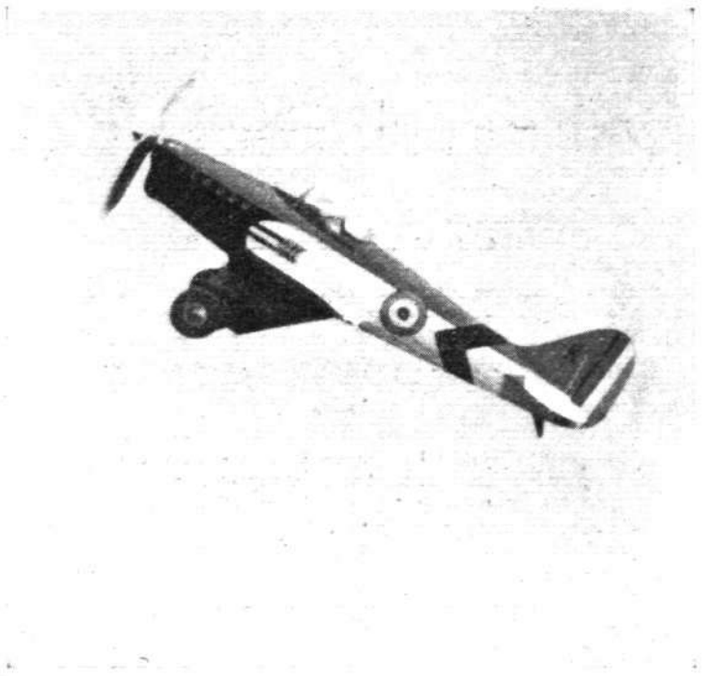
"Assuming the slipstream to be more or less constant" (writes the user) "it will be seen that the paper disc is directly affected by the air speed, i.e., the greater the speed the further the stick is pushed back, thus lifting the nose, and the lesser the speed the further the elevators are pulled down by the elastic. Thus, with careful adjustment to the size of disc and pull of elastic, things can be worked so that the model positively cannot stall, and the air speed is kept constant. The net results are almost crash-proof flights and something approaching good landings. It is quite amusing to watch the 'stick' jockeying backwards and forwards to take up any irregularities."

We have seen rather similar efforts in the past, mainly unsuccessful, but it does appear that this experimenter has, so to speak, hit on the right formula.

A GALA DAY

It is hoped that model aircraft enthusiasts will turn up in large numbers at the gala day of the Northern Heights M.F.C., which is to be held at Fairey's Aerodrome, on the Great West Road extension, on Sunday, June 30.

A long programme of events will start at 11.30 a.m., and will include a *concours d'élégance* for various classes, a duration contest, inter-team contest, and a flying scale model competition. Full particulars are obtainable from the Hon. Organiser, Mr. Charles A. Rippon, "Melita," 70, Hampden Way, Southgate, London, N.14.

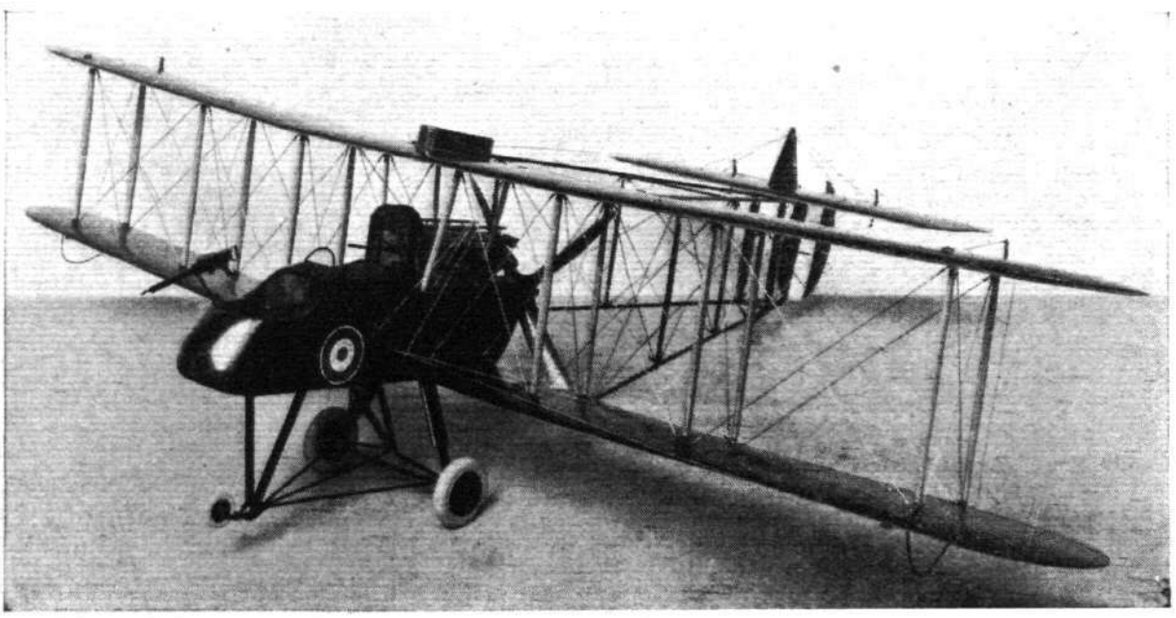


REALISM—IN PAPER. One of Mr. W. Rigby's latest flying models, made of varnished cartridge paper, caught in a lifelike attitude by a *Flight* photographer. This particular machine aroused great interest at the Paris international meeting reported on this page.

TEAM FOR AMERICA

The S.M.A.E.'s elimination trials for the selection of the British team for the Admiral Moffett International Competition were held at Fairey's aerodrome on April 22. The trials were run under the American rules for the contest, namely, the *best* duration of three flights (R.O.G.), and the result was as follows:

1, J. W. Kenworthy, 137.0 sec.; 2, C. T. Buffery 82.2 sec.; 3, D. E. Bianchi, 55.0 sec.; 4, L. Rushbrooke, 51.8 sec.; 5, C. S. Rusbrooke, 43.9 sec.; 6, P. Wilson, 34.0 sec.



AN INTERESTING CONTRAST to models of modern aeroplanes is this scale-model F.E.2D, made for the Science Museum, London. Museum models of this kind are usually made from wood with brass or aluminium details, and at least three coats of paint (usually cellulose) are very carefully applied, with a rubbing-down between each. The makers of this and a number of other models in the Museum are the Models Manufacturing Company, 43, Newington Causeway, London, S.E.1.

THE INDUSTRY

THERE TO BE SHOT AT

LAST year, it will be remembered, the students of the De Havilland Technical School designed and built the T.K.1 biplane which took fifth place in a field of forty-three in the King's Cup Race.

This year they are building another machine which, as mentioned in *Flight* some weeks ago, will be a two-seater low-wing cabin monoplane with a "Gipsy Major" engine. The main plane is a new type of plywood-covered structure which is extremely difficult to stress mathematically, particularly as it includes a new method of stiffening against torsion. Certain calculations have, however, been made and in order to confirm them a complete wing has been built, and was tested mechanically last week-end. The test was carried out in two stages, first to show the wing's behaviour in high-speed level flight, and secondly its behaviour when pulled out of a steep dive suddenly. The wing was set up on a dummy fuselage in the inverted position and, as shown in the accompanying photograph, loaded with bags of shot until the total weight put on it amounted to over two tons—many times the load which might be imposed by severe handling in the air. This was put on in steps representing once, twice, three times, etc., the normal weight of the machine which the wing would carry. At each step accurate measurements were made of the deflection both in bending and twisting. The condition of the material was examined carefully throughout the test for any sign of weakness and, it is said, showed itself to be perfectly satisfactory.

"PERSEUS" TWICE TYPE-TESTED.

The Bristol Aeroplane Co., Ltd., is evidently determined to make the "Perseus" sleeve-valve engine as near 100 per cent. perfect as is humanly possible. After the 100 hours type test towards the end of last year a second and equally successful type test was completed by the same engine. Then, to try out the "Perseus" under weak mixture conditions, a 250 hours' endurance cruising test was run. The engine was run for twenty-three ten-hour periods comprising 30 mins. at 665 b.h.p. (2,200 r.p.m.) and 9½ hours at 420 b.h.p. (2,150 r.p.m.). Two further ten-hour runs, each consisting of 9½ hours under cruising conditions and thirty minutes under climbing conditions, were carried out on a dynameter. The average fuel consumption was 0.435 lb./b.h.p./hr. and the oil consumption 7.35 pt./hr.; 87-octane fuel was used. When stripped the engine was found to be in excellent condition.

Production of the civil "Perseus II" will be begun this autumn. The normal power of the engine is about 650 b.h.p. at 2,200 r.p.m. Four have been delivered to Imperial Airways for installation in a Short "Scylla."

AT THE B.I.F.

The Mollart Engineering Company, of Thames Ditton, Surrey, who are responsible for Autogiro transmission drives, and whose ball joints are being adopted by a number of designers for use in controls, will be exhibiting their products on Stand D. 115 at the Birmingham Section of the British Industries Fair (May 20-31).

CAUSE AND EFFECT

The announcement that aircraft manufacturers had been advised to hold themselves ready to tender for new Royal Air Force requirements gave a fresh impetus to the rise in shares of aircraft companies towards the end of last week.

Heavy buying forced up prices generally, the advance being led by Rolls-Royce, which spurted at one time from 130s. to a new high record of 138s. 9d. The principal movements on May 9-10 and the considerable rise which has occurred in the past month are shown below:—

	April 10.	May 10.	Rise on Day.
Rolls Royce	111/3	137/6	7/6
Boulton Paul	7/-	11/3	1/3
Hawker Aircraft	25/9	32/9	-/9
Handley Page Pf.	16/-	21/6	-/10½
Fairey Aviation	23/9	28/3	1/-
D. Napier	9/3	13/9	1/6

ADHESIVE

A new adhesive cement, known as "Bostik," is said to be already gaining popularity among aircraft manufacturers for such purposes as securing windows in their frames; the variety of substances to which this adhesive can be successfully applied is extraordinarily wide. Full details are obtainable from the makers, the Boston Blacking Co., Ltd., Ulverscroft Works, Leicester.

Load-testing a wing of the D.H. Technical School's new King's Cup machine, as described in the adjacent column. (*Flight* photograph.)

PUBLICATIONS RECEIVED

The British Inland Airmail, April, 1933-*April*, 1935. Obtainable free from A. Phillips, philatelist, 4 and 5, Dock Street, Newport, Mon.

L'Aviazione Civile attraverso il Mondo. Indice Generale Anno 1934. *L'Aviazione Civile attraverso il Mondo.* No. 1, 1935: Ministero dell'Aeronautica Aviazione Civile E Traffico Aereo. Laboratorio Fotomeccanico, Rome, Italy.

Catalogue of Wellworthy Piston Rings, and Directory. Wellworthy, Ltd., Lymington, Hants.

National Advisory Committee for Aeronautics: *Bibliography of Aeronautics*, 1931, by Paul Brockett, price 50 cents; *Report No.* 498: Improved Airplane Windshields to Provide Vision in Stormy Weather, by W. C. Clay, 10 cents; *Report No.* 505: Tests of Nacelle-Propellor Combinations in Various Positions with Reference to Wings: IV, Thick-Wings; Various Radial-Engine Cowlings, Tandem Propellers; by J. G. McHugh, 15 cents; *Report No.* 506: Tests of Nacelle-Propeller Combinations in Various Positions with Reference to Wings: V, Clark Y Biplane Cellule, N.A.C.A. Cowled Nacelle, Tractor Propeller; by E. Floyd Valentine, 10 cents. *Report No.* 508: Analysis of 2-Spar Cantilever Wings with Special Reference to Torsion and Load Transference; by P. Kuhn, 10 cents. *Report No.* 509: General Equations for the Stress Analysis of Rings, by E. E. Lundquist and W. F. Burke; 5 cents. All from Superintendent of Documents, Washington, D.C., U.S.A.

Hutchinson's A to Z Time Tables: London to All Britain and Abroad by Train, Coach, Air and Sea. Price 1s. 6d. monthly. Volume 1, May, 1935. Hutchinson and Co. (Publishers) Ltd., 34, Paternoster Row, London, E.C.4.

NEW COMPANIES

AIR FLIGHTS LTD.: Private Company, registered May 7. Capital: £1,000 in £1 shares. Objects: To acquire the movable assets of the business of South Coast Air Lines and Aero Club and to carry on business as air transport contractors, etc. Permanent directors: John D. Fraser, Alfred L. Edmunds, Arthur I. C. Turner. Registered office: Belgravia Chambers, 72, Victoria St., London, S.W.1.

ZENITH AIRWAYS LTD.: Private company, registered May 8. Capital: £1,000 in 5/- shares. Objects: to operate all methods of aerial conveyance; manufacturers and repairers of and dealers in all types of aircraft, etc. The subscribers (each with four shares) are Herbert D. Ward, "Belvedere," Thames Drive, Leigh-on-Sea, Essex; Geo. T. Butler. The first directors are to be appointed by the subscribers.

COBHAM AIR ROUTES, LTD.: registered as a private company on May 3 with a nominal capital of £30,000 in £1 shares. Objects: to operate air lines, aerodromes and air ports, etc. The subscribers (each with one share) are Sir Alan J. Cobham, K.B.E., A.F.C., Little Park Hill, Bletchingley, Surrey; F. M. Cameron, 3, Teverton Mansions, W.C.1., secretary. The first directors are Sir Alan Cobham and Lady Gladys M. Cobham.

INCREASES OF CAPITAL

NATIONAL AVIATION DISPLAYS LTD. (Grand Buildings, Trafalgar Square, London, W.C.2.): The nominal capital has been increased by the addition of £5,500 in £1 ordinary shares beyond the registered capital of £5,000.

AIRWORK ENGINE SERVICE, LTD. (Heston Airport, Hounslow, Middx.): The nominal capital has been increased by the addition of £2,000 in £1 ordinary shares beyond the registered capital of £4,500.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in parentheses are those under which the specification will be printed and abridged, etc.)

Published May 9th, 1935.

27543. McCOLLOUGH, J. H.: Variable-pitch and reversible propellers. (426,724.)
22098. BIRKIGT, M.: Devices for reducing the recoil of guns on aircraft. (426,911.)

Published May 16th, 1935.

22857. HURD, G., AND TRIGGS, C. S. Propulsion of Shafts. (427,094.)
27996. NASEBY, T. W. Anti-aircraft shell or projectile. (427,103.)
28707. SUPERMARINE AVIATION WORKS (VICKERS), LTD., AND DICKSON, R. S. Landing-gear for aircraft. (427,185.)
28709. PETTERS, LTD., AND HILL, G. T. R. Tailless aeroplanes. (427,186.)
9566. FAIREY AVIATION CO., LTD., AND CHAPLIN, H. E. Wind or like screens for cockpits of aircraft, motor boats, or motor cycle sidecars, or for use in similar situations. (427,226.)

FLIGHT

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